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ABSTRACT

The basic objectives of this research, which involved children in the 2nd, 5th, 8th, and 11th grades, were to describe children's uses and perceptions of animals and to discern possible developmental stages in the evolution of attitudes toward animals. Personal interviews were conducted with 267 children from 16 public schools randomly selected from urban, small city, suburban, and rural areas of the state of Connecticut. Three major developmental stages in the evolution of children's perceptions of animals were found. The first stage, occurring from the 2nd to 5th grade, was characterized by a dramatic increase in emotional concern and general affection for animals. Since very young children were the most exploitative, harsh, and unfeeling of all children in their attitudes toward animals, environmental programs should focus on the affective realm. The transition from fifth to eighth grades witnessed the second major developmental stage--a major expansion in children's intellectual and cognitive understandings of animals. Therefore, factual learning should be emphasized at this stage. The third developmental stage occurred between 8th and 11th grades, during which time children's ethical concern for the welfare and kind treatment of animals increased dramatically. This stage offers the best opportunity for teaching about ethical relationships to animals and the concepts of ecology and wildlife management. (RM)

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CHILDREN'S ATTITUDES, KNOWLEDGE AND BEHAVIORS TOWARD ANIMALS*

Phase V

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CHAPTER I

INTRODUCTION

This report is the fifth and last in a series of monographs on the results of a national study of American attitudes, knowledge and behaviors toward wildlife and natural habitats.* Reports one-three focused on the findings of a national survey of 3,107 adult Americans residing in the 48 contiguous states and Alaska, as well as special surveys of trappers and livestock producers. The fourth report considered historical trends in American wildlife use and perception during the twentieth century. The latter report was based on an extensive content analysis of over 4,000 animal-related articles occurring in four regionally distributed newspapers from 1900-1975.

The fifth and final report will consider children's attitudes, knowledge and behaviors toward animals. The activities and views of four age groups are explored in this study; specifically, children in the 2nd, 5th, 8th and 11th grades. The basic objectives of this research are to describe children's uses and perceptions of animals, and to discern possible developmental stages in the evolution of attitudes toward animals.

It is an understatement to emphasize the difficulty of studying children's perceptions of animals, particularly very young children. This difficulty was compounded by the relatively little previous research on children's relations to animals, especially wildlife. This study should be regarded, thus, as an exploratory investigation and its findings as preliminary and tentative.

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* The other four reports are available from the Government Printing Office and are entitled: "Public Attitudes Toward Critical Wildlife and Natural Habitat Issues," Government Printing Office #024-010-00-623-4, 138 pp.; "Activities of the American Public Relating to Animals," Government Printing Office #024-020-00-624-2, 178 pp.; "Knowledge, Affection and Basic Attitudes Toward Animals in American Society," Government Printing Office #024-010-00-625-1, 162 pp.; and, "Trends in Animal Use and Perception in 20th Century America," Government Printing Office #024-010-006-21-8, 166 pp.

Because of the exploratory character of the research, it was decided not to choose the expensive option of obtaining a random sample of American children. The sample for this study was instead confined to the state of Connecticut. Within Connecticut, however, the sample included representative numbers of urban/rural, black/white and various socioeconomic classes of children.

Despite these limitations, a number of potentially important findings did emerge from the research. The results suggested, for example, the possibility of distinct developmental stages in the evolution of children's perceptions of animals, as well as significant differences in the perspectives of varying demographic and animal-related activity groups. Nevertheless, at the risk of belaboring the point, the results should be regarded as preliminary and indicative, most of all, of the need for further, more refined research, based on a larger and more representative sample of American children.

This report is divided into a number of sections. Chapters II and III are primarily introductory -- Chapter II reviews the results of other research on children's environmental and animal-related perceptions; while, Chapter III focuses on a description of the study's methodology. Chapter IV reports on the study's results regarding children's knowledge of animals, whereas Chapter V considers findings relating to basic attitudes towards animals. Chapter VI is a variation on these results, and reviews patterns of animal-related knowledge and attitudes among varying children's demographic groups. This section is followed by a chapter on children's behavioral contacts or activities involving animals. Chapter VII summarizes the results by considering major chronological or developmental shifts in children's attitudes, knowledge and behaviors toward animals. The last set of study results, presented in Chapter IX, considers children's symbolic perceptions and preferences for varying animals. Chapter X finally summarizes some of the study's findings by offering a number of policy and management suggestions.

Various people provided significant and important assistance. We are especially grateful to Dr. Lynn Llewallyn of the U.S. Fish and Wildlife Service for his support and encouragement, as well as to his colleagues, Dr. Ed Verberg and Dr. Dan Sokoloski. We owe a special debt of thanks to the various school systems in Connecticut that cooperated with us on the research, particularly the administrators and teachers who provided much of their time. Finally, a number of people directly assisted in the collection, analysis and compilation of the study's data. In particular, we wish to thank Joyce Berry and Carol Ziegler. Additionally helpful were Hob Calhoun, Jim Lyons, Sara Halprine, and Jennifer Lewis. Finally, a special expression of gratitude are due the U.S. Fish and Wildlife Service, in particular, and to a less but important extent, the G. R. Dodge Foundation, for providing the funds necessary to conduct the research.

CHAPTER II

LITERATURE REVIEW

This chapter identifies some of the social, behavioral, and demographic factors that other research has suggested have demonstrated affects on young people's perceptions of the natural world. This review is by no means comprehensive and inadvertently some important studies have been omitted. We have, nevertheless, attempted to review a wide range of relevant investigations with some very useful results emerging. The focus of most research in this field has not been wildlife but attitudes toward other environmental issues, such as air and water pollution, over-population, recycling, and land use. Attitudes toward these issues seem to be influenced by sociodemographic characteristics such as age (19, 21, 25), ethnic background (25), sex (11, 49), area of residence (10, 15, 21, 25, 49), scholastic ability (25, 49), socioeconomic status (15, 25), parental occupation (21), knowledge of the natural world (10, 20, 24, 43, 52, 57, 58), active participation in nature-oriented activities (4, 10, 16, 19, 57), and a variety of cultural agents including books, television, school, family and friends (9, 21, 32).

Relatively few efforts have considered the development of young people's attitudes toward wildlife. The few findings that are available seem to indicate an association between young people's attitudes toward animals and age (3, 27, 45, 51, 54), ethnic background (20, 25, 34, 61), sex (3, 4, 45, 51, 53, 54, 56), area of residence (51, 54), knowledge of animals (34, 51, 57), symbolic perceptions of animals (3, 5, 27, 35, 45, 48), participation in animal-related activities (4, 34, 51, 54), instruction in animal-related courses (4, 33), television (34, 51, 61), parents and movies (51).

Unfortunately, it is difficult to arrive at a comprehensive understanding of how these different variables influence young and growing children's perceptions of animals because of the variations in the size and characteristics of sample populations in these studies, their use of widely varying methodologies, and the diversity of research focus.

INFLUENCES ON ATTITUDES TOWARD ANIMALS

Age

Insufficient data exists on the development of attitudes toward wildlife from childhood to adulthood, because most research has focused on high school students or very young children. Systematic investigations of a wide age range have been carried out by Badaracco (3) and Johnson (27). When Badaracco examined grades one through twelve for preference in aspects of the natural environment, reptiles and insects dropped significantly in preference among older children. Age was also a crucial variable in Johnson's study on attitudes toward wolves. Children under ten years of age were the most negative toward the wolf, and views of people over thirty most closely resembled those of the under ten age group.

La Hart (34), Pomerantz (51), and Sanders (54) have provided scattered, though valuable data on the attitudes of secondary school students toward animals. In La Hart's investigation of the relationship between knowledge and attitudes toward wildlife among eighth graders, nonconsumptive users (those who observed, photographed, or fed wildlife) were more knowledgeable about animals than were consumptive users (those who fished or hunted wildlife), although the study by Pomerantz seemed to suggest the opposite. Pomerantz reported that a majority of seventh through twelfth grade students valued aesthetic more than utilitarian qualities of wildlife, were anxious to learn about wildlife, took part in wide variety of animal-related activities, and did not differ in terms of anthropomorphic feelings toward animals. Regarding concern for animal welfare problems, eighth graders appeared to care more than twelfth graders (54).

A more extensive understanding of how environmental attitudes develop in children has been reported by Dyar (15). In her attempt to identify an age group when environmental education might be most influential, she relied on political socialization literature, building on the notion of critical developmental periods in life. She chose to study seventh grade students because, according to the political socialization literature, most political learning occurs at the pre-high school level (23), political interest peaks in the seventh or eight grades and becomes firmly established around that time (17), and political attitudes about "community" remain fairly constant from age fourteen to high school (1).

In terms of attitudes toward the environment and animals, evidence exists to support Dyar's (15) notion of a critical period around the junior high school years. An increase in the stability of environmental attitudes as children grow older has been reported by Horvat (25), who found that environmental orientations of eighth graders were more stable and internally consistent than those of fifth graders. Giles (20) reported the most dramatic increases in conservation knowledge scores occurred between grades seven and nine and concluded: "Conservation can be most efficiently and effectively taught in grades seven, eight, and nine. If one grade is to be considered, grade seven appears to present the greatest opportunities (p. 497)." Concerning attitudes toward wildlife, La Hart (34) reported:

"Attitudes toward consumptive and nonconsumptive uses of wildlife appear to be well formed by the time young people reach eighth grade. This implies that programs designed to increase tolerance toward consumptive uses of wildlife should probably be directed at younger children (p. 74)." Pomerantz (50), however, found no significant difference between seventh through twelfth graders on the basis of interest in learning about wildlife, anthropomorphic feelings toward animals, and participation in a majority of wildlife-oriented activities.

A speculative and theoretical model of how these attitudes develop over the course of one's lifetime has been proposed by Morris (45). According to Morris' theory, there are seven ages of animal reactivity which progress from the "Infantile" Phase, when big animals represent parent substitutes, to the "Senile" Phase, when there is an intense interest in species struggling for survival. Between childhood and young adulthood, children pass through the "Infantile" Phase (between ages four and eight) and the "Infantile-Parental" Phase (between ages nine and fourteen), when children begin to react more strongly to smaller animals which are symbolic of infant figures. The "Objective Pre-Adult" Phase follows, when bug hunting, microscopes, and aquaria are the subjects of animal interest; and, when the young adult phase arrives, interest in animals is typically supplanted by a concentration on human relations. Although this theory is highly speculative, the research efforts previously described support the basis of Morris' model; that is, there seem to be progressive chronological stages in the development of children's attitudes toward the natural environment.

Sex

Most research suggests young females tend to express greater anti-hunting sentiment than do young males (51, 53, 56). Female children also appear to be more sympathetic toward animals (4), more concerned about animal welfare problems (54), and more anthropomorphic and aesthetically oriented to animals (51). A difference between sexes on specific animal preferences was one of Badaracco's (3) most striking results. Mammals and birds were popular with both sexes, but girls in grades 1 - 12 consistently ranked fish, reptiles, and biting and stinging invertebrates much lower than did boys. Morris (45) also found that boys and girls between four and ten years of age dislike spiders equally as much, but as they approached their teens, there was a dramatic increase in the girl's and not the boys' negative attitudes toward spiders.

Area of Residence

In our study of adult attitudes toward animals (31), persons raised in rural areas expressed stronger utilitarian sentiments toward animals, while those raised in cities of at least one million people were more likely to be moralistic. Pomerantz (51) provides some supporting evidence for this effect in children. As population size increased in her study of seventh through twelfth graders, a decrease occurred in the number of hunters, and an increase in opposition to hunting. Sanders (54), however, reported that inner city children expressed the least concern for animal welfare problems, and children from the suburbs expressed the most concern.

Ethnic Background

In a variety of resource-related recreational activities (e.g., camping, hiking, hunting), except for fishing, participation by young urban blacks was "noticeably absent" according to Washington (61), and understanding of wildlife was gained primarily from television shows. Additionally, knowledge of wildlife and the environment has been consistently found to be lower among young blacks than whites (20, 34), and Horvat (25) reported a lack of concern for environmental problems in urban black students.

One reason, according to Washington, why "wildlife is little more than a vestigial component in the lives of many urban blacks" (61, p. 15) is the lack of opportunity for meaningful wildlife-related experiences during childhood.

Knowledge of Animals

According to La Hart (34), a relationship exists between what young people know and feel about wildlife, but the association is not a particularly strong one. Knowledgeable eighth graders were more likely to recognize the importance of lower forms of animal life and preserving endangered species, to have greater tolerance for predators, and to oppose the outlawing of hunting. As previously reported, La Hart also found that eighth graders who engaged in nonconsumptive wildlife activities were more knowledgeable about animals than consumptive users. Pomerantz (51), however, reported the opposite effect. Among the secondary school students she studied, more hunters than nonhunters had high knowledge scores, and more nonhunters had high knowledge scores than antihunters.

La Hart (34) obtained some interesting results on attitudes not related to knowledge. For instance, both high and low knowledge groups responded similarly to questions about the emotional capacities of animals and the health conditions of wild animals compared to pets. La Hart concluded that despite varying levels of knowledge about wildlife, young people maintain anthropomorphic attitudes and have little understanding of the laws of natural selection.

Several investigators have demonstrated that males are more knowledgeable about animals than females (33, 51, 57), and that whites, children with parents who have a college education (34), and rural children (51) receive comparatively higher scores on knowledge of animals tests.

Symbolic Perceptions of Animals

When familiar symbols (e.g., black and white line drawings of a squirrel, deer and coyote) were used to convey aspects of natural history to first through twelfth grade students, mammals were the most popular category, birds second, and fish third (3). Reptiles, harmless invertebrates, amphibians, and biting and stinging invertebrates were very unpopular but young children seemed to have more of an affinity for these creatures than did older children.

Snakes were liked the least of all creatures by more than 25% of the children from four to fourteen years old who were studied by Morris (45). The greatest snake hatred occurred at age six. Children under ten also had the most negative perceptions of wolves, which were regarded as dangerous, bad, destroyers of moose and deer populations, and as having no value (27).

Morris (46) identified twenty anthropomorphic characteristics to account for the popularity of animals like the panda, one of which was size. In childhood, he suggests, large-sized animals are preferred because they "fit the role of the omnipotent parent," whereas older children are more attracted to smaller animals, like pets, because they fulfill the role of infant figures.

Participation in Animal-oriented Activities

La Hart found that "animal activities impact attitudes as much as knowledge and this supports encouraging wildlife-oriented activities like camping, birdwatching, and hunting and fishing as a means of educating young people" (pp. 73 - 74). Similar results were obtained by Baird (4) who reported, "If one were to try to change attitudes, education without an experiential component might not be very effective" (p. 12).

Pomerantz (51) found young hunters were more active than young non-hunters and antihunters in a wide variety of wildlife-oriented activities. Males outnumbered females in hunting, fishing, and catching insects, and more females than males went horseback riding and visited zoos. Differences were also found between rural and urban children, with those from rural areas participating in more animal-related activities.

George (19) maintains that membership in conservation clubs and nature camp experiences are strongly associated with conservation attitude change in high school students. Concerning domestic animals, owning a pet appears to exert a positive influence on animal welfare concerns among high school students (54), to have therapeutic effects on emotionally disturbed children, and to ease young people's anxieties about other animals and nature (37, 38).

Activities that seem to be helpful to high school students in scoring well on wildlife knowledge tests include biology courses (10, 20, 57), general science courses (20, 57), fishing (20, 57), hunting (20, 51), trapping

(20) and camping (10, 20).

Other Influences

"Teacher's opinions play a role in the socialization of children's attitudes, even though evidence of the amount of such attitude transmission is neither readily available nor precise" (23). Information is available, however, on the affects of teachers' instruction methods, television, parents, and movies. Direct instruction methods, in which children examined the anatomical and behavioral characteristics of live spiders and snakes, promoted positive attitudes toward these animals in 9 - 12 year olds (33). Indirect instruction methods, such as slides, movies, and lectures about the anatomy and behaviors of spiders and snakes, did not have as profound an influence. Also, the positive attitudes achieved through the direct instruction method generalized to other species of spiders and snakes and were stable up to six months after instruction.

Television also appears to have a significant affect on how wildlife attitudes are developed. Pomerantz (51) found that 87% of secondary school children felt that television influenced their interest in wildlife. According to Washington (61), black students who live in metropolitan areas consider wildlife TV programs to be the most important factor contributing to their appreciation of wildlife. LaHart (34) also determined that watching wildlife programs was more important to wildlife knowledge than hunting or fishing. Finally, parents and movies were chosen as major influences on attitudes toward wildlife by 75% of the children in Pomerantz's (51) study.

CHAPTER III

METHODOLOGY

SAMPLE

Twenty-two primary and secondary public schools were randomly selected from urban, small city, suburban, and rural areas of the state of Connecticut to obtain a sample of children.* Only schools within public school systems were considered. Areas of residence had to meet standards of population size and kind of community (Table 1). Following a letter of introduction to school officials, twenty schools agreed to participate in the survey. The investigators then met with superintendents, principals and teachers to clarify the research goals and to arrange interview schedules and the random selection of students. Sixteen schools representing ten towns in four areas of residence participated in the study.

The total sample included 63 second, 68 fifth, 67 eighth, and 69 eleventh grade students: a total of 267 children from ages 6 - 18. Teachers were instructed not to choose the most bright or nature-oriented students but to select students randomly (e.g., every fourth student) from alphabetical class listings.** The sociodemographic characteristics (i.e., age, sex, ethnic background, area of residence) of the total population appear in Table 2.

The most appropriate data-gathering technique for this research was a

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* National representation was not a concern of this exploratory study. The development of a variety of new attitude-measuring techniques and the selection of a small and regionally representative sample were preferred alternatives to the assessment of attitudes of a large national sample.

**Approximately 12% of the sample was not selected on a purely systematic and random basis. Two schools requested that we secure parental permission. Sample populations of these schools were randomly drawn from the group of students receiving parental permission.

TABLE 1

COMPOSITION OF SAMPLE FROM FOUR AREAS OF RESIDENCE

AREA OF RESIDENCE	CHARACTERISTICS OF THE AREA	SAMPLE SIZES X GRADE LEVEL			
		2	5	8	11
RURAL	1. COMPLETE PUBLIC SCHOOL SYSTEM (GRADES 1 - 12)				
	2. POPULATION LESS THAN 6,000	15	12	20	20
	3. PRIMARILY AGRICULTURAL, NOT EXCLUSIVELY RESIDENTIAL OR SUBURBAN				
SUBURBAN	1. COMPLETE PUBLIC SCHOOL SYSTEM (GRADES 1 - 12)				
	2. POPULATION LESS THAN 25,000 AND GREATER THAN 6,000	24	24	7	7
	3. EXCLUSIVELY RESIDENTIAL/SUBURBAN, NOT AGRICULTURAL OR INDUSTRIAL				
SMALL CITY	1. COMPLETE PUBLIC SCHOOL SYSTEM (GRADES 1 - 12)				
	2. POPULATION LESS THAN 50,000 AND GREATER THAN 25,000	6	11	20	10
	3. PRIMARILY INDUSTRIAL				
URBAN	1. COMPLETE PUBLIC SCHOOL SYSTEM (GRADES 1 - 12)				
	2. POPULATION GREATER THAN 50,000	18	21	20	32
	3. INDUSTRIAL				
	TOTAL	63	68	67	69

TABLE 2

SOCIODEMOGRAPHIC CHARACTERISTICS OF TOTAL SAMPLE BY GRADE, AGE, SEX, RACE, AND AREA OF RESIDENCE

	%(N) OF GRADE 2 (TOTAL N=63)	%(N) OF GRADE 5 (TOTAL N=68)	%(N) OF GRADE 8 (TOTAL N=67)	%(N) OF GRADE 11 (TOTAL N=69)
AGE	6- 1.6 (1) 7-39.7(25) 8-49.2(31) 9- 9.5 (6)	10-51.5(35) 11-48.5(33)	12- 3.0 (2) 13-74.6(50) 14-19.4(13) 15- 3.0 (2)	15-18.8(13) 16-60.9(42) 17-18.8(13)
SEX				
MALE	52.4(33)	47.1(32)	49.3(33)	47.8(33)
FEMALE	47.6(30)	52.9(36)	50.7(34)	52.2(36)
RACE				
WHITE	76.2(48)	75.0(51)	76.1(51)	82.6(57)
BLACK	19.0(12)	17.6(12)	16.4(11)	10.1 (7)
HISPANIC	3.2 (2)	7.4 (5)	7.5 (5)	4.3 (3)
OTHER	1.6 (1)	0	0	2.9 (2)
AREA OF RESIDENCE				
RURAL	23.8(15)	17.6(12)	29.9(20)	29.0(20)
SUBURB	38.1(15)	35.3(24)	10.4 (7)	10.1 (7)
SMALL CITY	9.5 (6)	16.2(11)	29.9(20)	14.5(10)
URBAN	28.6(18)	30.9(21)	29.9(20)	46.4(32)

%(N) OF TOTAL SAMPLE (TOTAL N = 267)

AGE
6- .4 (1)
7- 9.4(25)
8-11.6(31)
9- 2.2 (6)
10-13.1(35)
11-12.4(33)
12- .7 (2)
13-18.7(50)
14- 4.9(13)
15- 5.6(15)
16-15.7(42)
17- 4.9(13)
18- .4 (1)

SEX MALE 49.1(131) FEMALE 50.9(136)

RACE WHITE 77.5(207) BLACK 15.7(42) HISPANIC 5.6(15) OTHER 1.1(3)

AREA OF RESIDENCE RURAL 25.1(67) SUBURB 23.2(62) SMALL CITY 16.6(47) URBAN 34.1(91) personal interview. This technique was selected over written or group-administered questionnaires in order to enhance the quality of the data and to allow the interviewers an opportunity to adapt wording, explain concepts, and sustain interest levels according to the needs of individual children.

It was recognized that valid expressions of attitudes would be hindered if the interview was perceived as a test. To counteract this effect, all subjects were told: "This is not a test, there are no right or wrong answers, and you will not be graded. Your teachers and parents will never see your answers." Additionally, before and during the interview, children were asked to be as honest about their feelings as possible. In addition, a film depicting a variety of human relationships with animals and an accompanying questionnaire were designed in hopes of eliciting more spontaneous and valid responses. These unstructured responses were carefully recorded by the interviewers.

In April 1979, over one thousand attitude, knowledge, and behavior questions were pretested on approximately 50 children, ages 6 to 18, from rural, suburban and urban parts of Connecticut. The attitude questions were based on the same typology of nine basic orientations toward animals used in the national adult survey (Table 10, Chapter V), and many knowledge and behavior questions were also patterned after those in the national study. Pretest questions were omitted from the final questionnaire for the following reasons: too general, double negatives, difficult concept or wording, regional or educational bias, and specialized knowledge.

The final questionnaire contained approximately 110 attitude, knowledge, and behavior questions, and 8 questions on personal background. Three versions were developed and varied in wording, concept level, and response formats for the second, fifth and eighth, and eleventh grade levels. All versions followed the same structural format -- sociodemographic characteristics, attitudes, symbolic perceptions, knowledge, animal-related activities, and the film.

In the case of complicated questions, children were provided with flash cards listing the response choices (e.g., strongly agree, slightly agree, don't agree, slightly disagree, strongly disagree). Fifth, eighth, and eleventh graders were asked to choose their response from a written list; second graders were typically asked to point to one of five different faces that illustrated their response.

Interviews with second graders required approximately 90 minutes, fifth and eighth graders - 75 minutes, and interviews with eleventh graders - 60 minutes. The potential affect of fatigue and limited attention spans of younger children were carefully considered during the questionnaire construction. Procedures employed to minimize the potential for distorted responses due to the length of the interview included: locating the more demanding questions at the beginning of the survey, including colorful slides with the knowledge test, and concluding the interview with the film methodology.

Most interviews were conducted at the students' schools during regular school hours. (During the summer months, approximately five interviews were held at students' homes.) Every effort was made to adapt the interview schedules to the time constraints of teachers and the curricular demands of students.

The interviewers were research assistants and graduate students at the Yale School of Forestry and Environmental Studies who were trained by the investigators to administer all three versions of the survey questionnaire.

Attitude Questions

Past research on children's attitudes toward animals has strongly suggested the importance of utilizing a variety of measuring instruments, sufficiently flexible to account for individual expressions of attitudes and designed to stimulate spontaneous and authentic responses. One rationale for using different instruments is the multi-faceted nature of the concept being studied. Another rationale concerns the 'social desirability' bias, which has been cited as a major shortcoming in research on children's concerns for animal welfare problems (60). As Dyar suggested, "since such measures may be subject to conscious or unconscious distortion of answers (to create a favorable or unfavorable impression) it is important to use as many techniques as possible to minimize such effects" (p. 48).

Several authors have cited the drawbacks of some common techniques and the literature is replete with encouragement for developing alternative methodologies. For example, according to Horvat (25), the shortcomings of paper-and-pencil tests for measuring children's attitudes are: the lack of motivation provided for the young subjects, the favoring of those who have reading and writing skills, and the 'social-desirability' bias described above.

For these reasons, a number of methodologies, including a film test, were designed to assess children's attitudes toward animals. Twenty-seven attitude questions were asked at the beginning of the interview and 27 more after the film was projected. Closed and open-ended questions, scenarios, simple statements with Likert-scale response alternatives, and multiple choice items were included.[*] Additionally, eighteen of the total 54 attitude items were taken from the national adult survey.

Interviews with second graders required more time because of the different response format specially designed for this grade level. In the pretest, second graders had difficulty with attitude questions that required one answer out of five or more alternatives. Therefore, multiple response choices were asked as separate items in the second grade questionnaire. These items were then followed by a summary question about the most preferred alternative of the choices they had indicated the strongest preference for.

In order to determine the presence and relative strength of the nine attitude types, attitude scales were designed from the 54 attitude questions. The largest attitude scale -- the negativistic -- consisted of thirteen attitude items, and scale scores ranged from 0 to 21 for second graders and 0 to 24 for fifth through eleventh graders.[**] The scientistic scale was the smallest, consisting of five questions, with scores ranging from 0 to 10 for second graders and 0 to 11 for fifth through eleventh graders.

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[*] 'Closed-ended' refers to questions with a fixed set of response alternatives; 'open-ended' questions allow the respondent to provide any answer; Likert scales involve an ordinal range of answers from positive to negative (e.g., strongly agree to strongly disagree) responses.

[**] The reason for the lower attitude scale range for second graders is that after the data were collected, it was discovered that second graders rarely discriminated between 'strongly' and 'slightly' agree or disagree responses. Therefore, when the attitude scales were constructed, 'strongly' and 'slightly' responses of second graders were treated the same and were assigned a mean value (i.e., if strongly agree = 1 and slightly agree = 2, either answer was assigned a value of 1.5).

Seventy-three animal-related films were screened for footage that depicted the attitudes described in Table 10 (with the exception of the neutralistic attitude). After having obtained the permission of film producers and copyright holders, a 30-minute film was created from appropriate footage selected from 15 films. For example, the footage selected for the "humanistic" segment of the film consisted mostly of petowners and their cats, dogs, tropical fish, gerbils, etc. -- even pet monkeys and boa constrictors were represented. The film was completely silent to avoid the potentially confounding effects of narration, background music or animal sounds.

The film was shown to each child on an individual basis, and during projection interviewers administered an 87-item attitude questionnaire. Questions asked during each attitude segment were impartial and straight-forward, e.g., "Would you like to have a pet cat? Why or why not?" "What do you think of the monkey sitting at the kitchen table?" Twenty-seven questions were included in the attitude scales described in Table 10. The remaining sixty items served to focus attention on critical film segments, stimulate reflection, and sustain interest in the film.

Interviewers were instructed to take copious notes on all verbal and nonverbal reactions to the film. This information was invaluable when the intensity of open-ended responses were analyzed. For example, a child's first reaction to the "scientistic" segment of the film (fetal pig dissection in a school laboratory) may have been nonverbal -- varying from silent curiousity to covering their eyes -- or verbal -- varying from "Gee! That's neat!" to "Gross!" Unstructured, spontaneous responses such as these were carefully recorded and were later considered in determining response scores in the scientistic attitude scale.

Knowledge Questions

The questionnaire contained 45 knowledge questions covering five vertebrate classes and invertebrates. Students were asked 19 true or false questions about behavioral and physical characteristics of animals. (Seven of these true or false questions were taken from the national adult survey.) The knowledge test also included 11 multiple choice questions about the kinds of foods that animals eat and 15 animal identification questions. Color slides accompained these twenty-six items to minimize the possible impacts of vocabulary differences and fatigue. Eleventh graders were asked 11 additional true or false questions that were taken directly from the national adult survey.

To counteract the effects of the testing atmosphere, students were told not to worry if the questions seemed difficult, no one was expected to correctly answer them all, it was important not to guess, and "don't know" answers were fine. ("Don't know" responses were assigned a score slightly higher than wrong answers.)

An animal knowledge scale was constructed from the 45 knowledge items. (The eleven additional questions asked of eleventh graders were not included in the knowledge scale). Responses to the animal identification questions were scored according to their completeness -- e.g., a higher score was assigned to the answer "bald eagle" than to "eagle." Multiple choice questions regarding the foods animals eat were scored similarly -- e.g., foods that deer eat -- mice, grass or twigs -- were scored 0, 2 and 3, respectively.

Symbolic Questions

Three different instruments were designed to measure preference for and symbolic perceptions of animals. The first, a semantic differential, employed a five-point scale which assessed perceptions of five animals according to responses to a set of seven bipolar adjectives (e.g., Dog: very good, slightly good, not good or bad, slightly bad, very bad). The second technique was the naming of three favorite animals and from these the selection of the most favorite. Third, students were asked to indicate on a five-point preference scale how much they liked or disliked thirty-three wild and domestic animals. (This instrument was taken from the national adult survey.) Immediacy of response was important for the symbolic items and students were asked to take no more than a few seconds to answer.

Animal-related Activities

This section contained questions on frequency of participation in the following activities: pet ownership, animal-related television viewing, animal husbandry, hunting, trapping, fishing, birdwatching, attending zoos and natural history museums, animal club membership, reading animal books, learning about animals in school, personal injury inflicted by animals, scientific animal study, and camping.

CHAPTER IV

KNOWLEDGE OF ANIMALS

A major objective of the study was determining the level of children's knowledge and understanding of animals. As indicated, knowledge was assessed in primarily four ways: a series of true/false and multiple choice questions, a pictorial identification test of individual animals, a battery of questions regarding the primary foods consumed by various animals, and a film segment focusing on ecological relationships and processes.

The results generally suggested that children's knowledge of animals is quite limited. Basic biological understanding of many animals appeared to be lacking, and comprehension of fundamental ecological processes was deficient. For example, less than 30% were aware that the spring peeper is a frog, and only 29% knew Koala bears are not really bears. A disappointing 21% understood veal is not derived from lamb, and 55% believed whales are a large fish. A better but disappointing 60% realized all birds do not fly south for the winter, but only 52% knew the penguin is a bird, just 26% knew that a tern is not an insect, and only 29% realized tigers do not live in Africa.

The lack of ecological understanding among children was most apparent in the film testing segment. For example, the large majority tended to interpret predation and nutrient cycling in anthropomorphic and negative terms, rarely appreciating or identifying the ecological values of these activities. For example, the efforts of dung beetles were generally considered "disgusting," and many children regarded predation as "wrong" or regretable.

Some encouraging results, however, did occur. The most impressive finding was the superior knowledge of children compared to adults, when responses to questions asked on both the children's and adult studies were contrasted.* The greater knowledge of children, particularly 11th graders, compared to adults was especially evident on questions concerning invertebrates and basic biological characteristics. On the other hand, adults tended to be more knowledgeable on questions concerning domestic animals or situations with a strong practical significance -- e.g., human injury inflicted by animals. The children's greater knowledge of invertebrates was suggested by 78% of all children and 86% of 11th graders, compared to 50% of adults, knowing spiders do not have 10 legs (Table 3). Additionally, 66% of all children and 75% of 11th graders recognized snakes are not covered with a thin layer of slime, compared to 52% of adults. When adults were compared with 11th graders only, 23% of adults versus 48% of the 16 year olds knew inch worms are not in the same family as earth worms; and 64% of 11th graders in contrast to 44% of adults recognized sharks and sting rays have skeletons of cartilage rather than bone.

Children were also relatively able to recognize a variety of animal species. For example, at least 85% correctly identified a bluejay, swan, rattlesnake, eagle, raccoon, dolphin, wolf and monarch butterfly. 71% also recognized a swordfish, nearly two-thirds a dragonfly, and almost three-quarters correctly identified a duck, although only 28% recognized it as a mallard duck. On the other hand, only 8% could identify a great blue heron, just one-third recognized a duck-billed platypus, and only 15% a bobwhite.

Children were also relatively knowledgeable about the primary foods of a variety of species. For example, most children knew of the primary diets of mice, rabbits, wolves, owls, robins, caterpillers, snakes and frogs. Only a

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*The national study of 3,107 adults, 18 years and older, is briefly identified in the introductory chapter.

TABLE 3

SELECTED KNOWLEDGE QUESTIONS BY 11TH GRADERS AND ADULTS

	% CORRECT ANSWER	
	11TH GRADERS	ADULTS
SPIDERS HAVE 10 LEGS	85.5	49.8
VEAL COMES FROM LAMB	26.1	54.0
THE SKELETONS OF SHARKS AND STING RAYS ARE MADE OF CARTILAGE RATHER THAN BONE	63.8	43.8
INCH WORMS ARE IN THE SAME FAMILY OF ANIMALS AS EARTH WORMS	47.8	23.4
NORTH AMERICAN TARANTULAS ARE EXTREMELY POISONOUS TO MAN	34.8	35.8

minority, however, knew which foods were consumed by trout, deer or bobcats.

The animal knowledge questions were further grouped into a number of generic categories (Table 4). Based on mean scores of these categories, children appeared to be most knowledgeable about the basic biological characteristics of animals (e.g., "spiders have ten legs," "snakes are not covered by a thin layer of slime"). This knowledge question category had an overall mean score of 56.8, on a scoring range from 0 to 100. By comparison, the adult national sample obtained a mean of 55.3 on this type of knowledge question. The second highest mean score among children concerned invertebrate animals (x = 47.5). Adults, in contrast, had a dramatically lower invertebrate question mean of 34.7. Children appeared, thus, to possess much greater understanding than adults of the biological characteristics of animals, and of "lower" life forms such as invertebrates.

On the other hand, the adult sample obtained far higher mean scores on questions concerning animals associated with human injury or property damage, and questions pertaining to relatively familiar, typically domestic animals. Adults had respective means on these two knowledge categories of 63.4 and 53.4. The children's sample, in contrast, obtained mean scores of 39.5 on questions concerning animals associated with human injury or harm, and 39.2 on the domestic animal category.

Both children and adults had similar scores on the "taxonomic characteristics of animals" category (e.g., "Koala Bears are not really bears") -- 37.3 for adults and 38.5 among children. Finally, both the children and adult samples revealed relatively little knowledge of endangered or threatened species -- only one- quarter of either sample obtained the correct answer on questions concerning these animals.

TABLE 4

MEAN CORRECT SCORE BY TYPES OF KNOWLEDGE QUESTIONS, CHILDREN'S AND ADULT SAMPLES

	ALL CHILDREN (<18 YEARS OF AGE)	11TH GRADE	ADULT (>18 YEARS OF AGE)
BIOLOGICAL CHARACTERISTICS	56.8	63.9	55.3
INVERTEBRATES	47.5	51.3	34.7
HUMAN INJURY	39.5	47.8	63.4
DOMESTIC ANIMALS	39.2	44.4	53.4
TAXONOMIC CHARACTERISTICS	37.3	43.9	38.5
ENDANGERED SPECIES	24.6	24.6	27.4

Eleventh graders had much higher knowledge scores than adults on a number of knowledge question categories. This difference occurred despite the national adult study finding of insignificant knowledge differences between 18 - 25 year olds and respondents over 66 years of age. The greater knowledge of 11th graders was particularly evident on questions concerning the biological characteristics of animals and invertebrates. The respective mean scores of 11th grade children on these knowledge question categories were 63.9 and 51.3, in contrast to adult sample means of 55.3 and 34.7. Adults still outscored 11th graders, however, on the human injury and domestic animal question categories -- on the former, a mean of 63.4 for adults versus 47.8 for 11th graders and, on the latter, 53.4 versus 44.4.

DEMOGRAPHIC DIFFERENCES

Highly significant knowledge scale differences occurred among children distinguished by age, ethnicity and geographic place of residence (Table 5). Male/female differences were also significant but at a more modest .02 confidence level. The relative distribution of knowledge scores among major children's demographic groups is indicated in Figure 1. Eleventh grade children had the highest mean scores; 2nd graders, the lowest. Relatively high knowledge scores occurred among rural children and 8th graders. In contrast, relatively low knowledge means were characteristic of black children and children residing in large cities.

Age distinctions were especially impressive with linear and progressive increases in knowledge score occurring among older age groups. Very pronounced differences in factual and conceptual understanding of animals distinguished 11th from 2nd graders. 5th graders were also substantially more

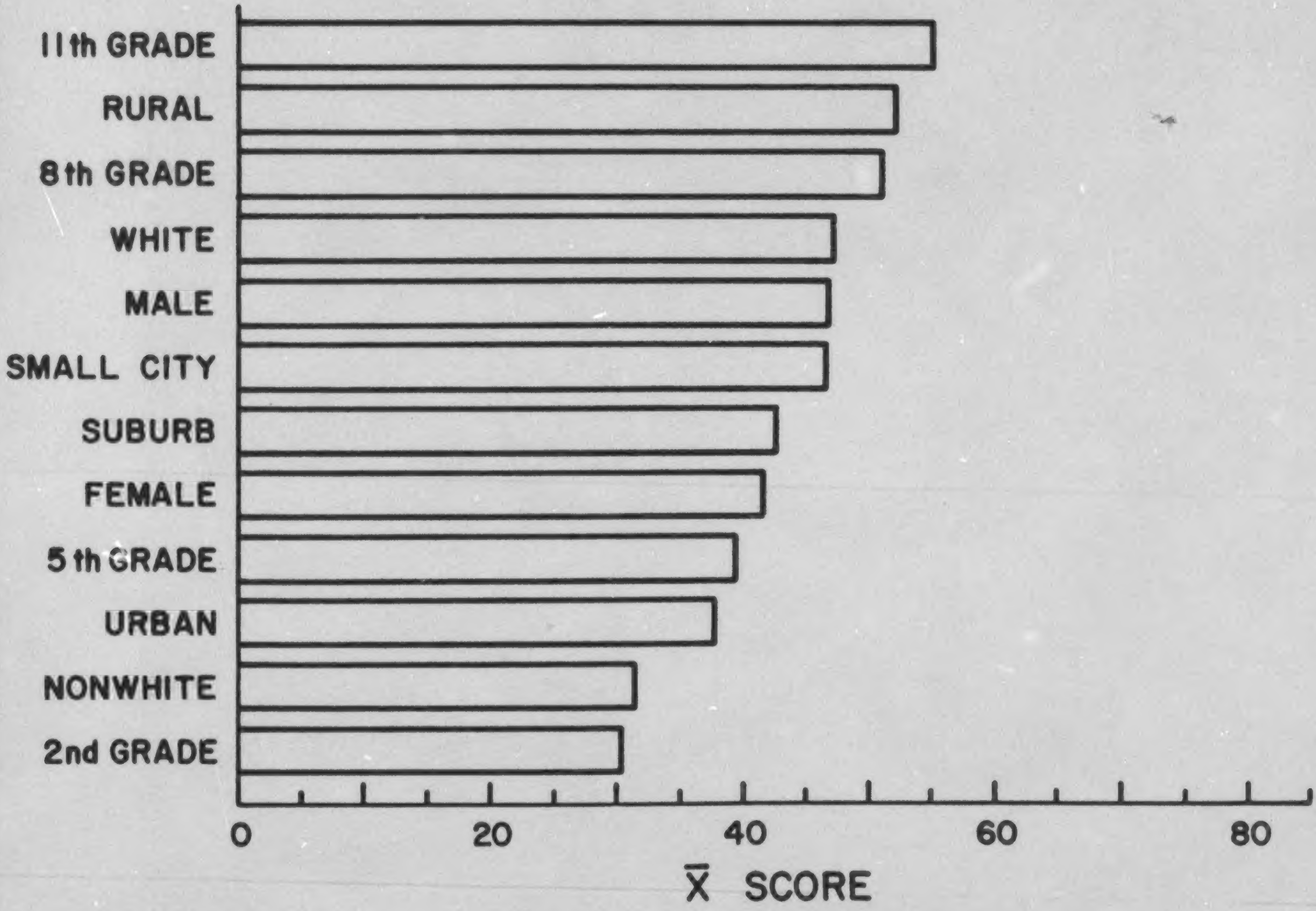
TABLE 5

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION RESULTS ON KNOWLEDGE SCALE AMONG AGE, SEX, ETHNIC AND URBAN/RURAL GROUPS

	SIG F	$\bar{X}$ SCORE	DEVIATION FROM GRAND MEAN AFTER ADJUSTING FOR INDEPENDENT AND COVARIATE VARIABLES
AGE	.00		
2ND GRADE		30.50	-13.99
5TH GRADE		39.64	- 5.64
8TH GRADE		51.18	7.45
11TH GRADE		55.11	11.57
SEX	.02		
MALE		47.03	2.47
FEMALE		41.82	- 2.39
ETHNICITY	.02		
WHITE		47.40	1.17
NONWHITE		31.60	- 5.72
URBAN/RURAL	.00		
URBAN		38.00	- 5.96
SMALL CITY		46.90	- 1.13
SUBURB		42.90	- 1.13
RURAL		52.30	5.23

Figure 1

KNOWLEDGE SCALE MEAN SCORES
BY CHILDREN DEMOGRAPHIC GROUPS



knowledgeable than 2nd grade children, 8th graders were more knowledgeable than 5th grade children, and 11th graders revealed greater knowledge than 8th graders. Knowledge scale differences among the two oldest groups, however, were substantially less divergent than between 5th and 8th graders, suggesting a decline in the affect of age as children entered the teen age years. By far, the greatest increase in knowledge scores occurred between 5th and 8th grades. The lack of knowledge scale differences among adults over 18 years of age further suggests the decreasing importance of age on knowledge of animals. Illustrative knowledge question differences among different age groups are indicated in Table 6.

Ethnic differences were very striking, particularly the very low knowledge scores of nonwhites. Black children had the lowest knowledge scores of any demographic group with the exception of 2nd graders. Indicative of these differences, 59% of white compared to 37% of nonwhite children knew bats do not see in the dark; 54% of white versus 34% of black children recognized whales are not large fish; and, 36% of white versus no nonwhite children correctly identified a mallard duck (Table 7). These knowledge scale differences remained after considering the possible confounding effects of other demographic variables, particularly urban/rural status. Very significant black/white knowledge scale differences also occurred on the national adult survey.

Urban/rural differences were very significant, particularly when comparing children living in large cities with those residing in the most rural areas. Rural children had the second highest knowledge scale scores, in contrast to large city children, who had the third lowest scores. Illustrative of urban/rural knowledge differences, 50% of rural versus 10% of

TABLE 6

SELECTED KNOWLEDGE QUESTIONS BY 2ND, 5TH, 8TH AND 11TH GRADERS

	% CORRECT ANSWER				
	2	5	8	11	SIG
ALL BIRDS FLY SOUTH IN WINTER	23.8	57.6	76.1	89.9	≤.001
A WHALE IS A VERY LARGE FISH	15.9	31.8	65.7	85.5	≤.001
INSECTS HAVE BACKBONES	38.1	61.5	65.7	73.9	≤.001
A DOG COOLS ITSELF BY PANTING	39.7	56.1	64.2	68.1	≤.001
THE TWO POISONOUS SNAKES FOUND OUTSIDE IN CONNECTICUT ARE THE COPPERHEAD AND THE CORAL SNAKE	17.7	29.2	40.3	47.8	.013

TABLE 7

SELECTED KNOWLEDGE QUESTIONS BY ETHNICITY

	% CORRECT ANSWER		
	WHITE	NONWHITE	SIG
BATS USE THEIR EYESIGHT TO SEE IN THE DARK	59.2	36.6	.013
A WHALE IS A VERY LARGE FISH	54.4	34.1	.007
SNAKES ARE COVERED WITH WET SLIME	69.4	46.3	≤.001
THESE ANIMALS ARE MAMMALS -- BATS, PORPOISES, AND GOATS	51.0	36.6	.012

children residing in the large cities correctly identified a mallard duck; 53% of rural children recognized a monarch butterfly compared to 24% of urban children; and, 55% of rural students knew the primary food of trout compared to 22% of urban children. Additionally, 48% of rural compared to 21% of urban children knew the spring peeper is a frog; and, 71% of rural versus 55% of urban students knew snakes do not possess a thin layer of slime in order to move more easily (Table 8).

Male/female differences were less pronounced, although still significant at the .02 level. Greater knowledge among male children was suggested by 68% of male compared to 53% of female children knowing insects do not have backbones, and 59% of male versus 46% of female students correctly recognizing the penguin is a bird (Table 9). Significant male/female differences typically occurred when the animal was a predator. For example, 65% of male children correctly identified a bald eagle versus 48% of female students; 42% of male students compared to 27% of female children knew the two poisonous snakes found in Connecticut; and 90% of male versus 77% of female children correctly identified a rattlesnake. Species preference results also revealed a more negative view of predator animals among female than male children.

TABLE 8

SELECTED KNOWLEDGE QUESTIONS BY POPULATION OF PRESENT RESIDENCE

	% CORRECT ANSWER				
	RURAL	SUBURBAN	SMALL CITY	URBAN	SIG
BATS USE THEIR EYESIGHT TO SEE IN THE DARK	63.6	45.2	68.1	43.3	.051
SPIDERS HAVE 10 LEGS	90.9	69.4	66.0	79.8	.023
SNAKES ARE COVERED WITH WET SLIME	71.2	79.0	59.6	55.1	.008
THE SPRING PEEPER IS A KIND OF FROG	48.5	22.6	19.1	21.3	.001

TABLE 9

SELECTED KNOWLEDGE QUESTIONS BY SEX

	% CORRECT ANSWER		
	MALE	FEMALE	SIG
INSECTS HAVE BACKBONES	68.0	52.9	.001
THE TWO POISONOUS SNAKES FOUND OUTSIDE IN CONNECTICUT ARE THE COPPERHEAD AND THE CORAL SNAKE	41.7	27.2	.006
A PENGUIN IS NOT REALLY A BIRD	58.9	46.3	.112
CORRECT IDENTIFICATION OF BALD EAGLE	64.9	47.8	.003

CHAPTER V

ATTITUDES TOWARD ANIMALS

How do children value and perceive animals and can distinctions be discerned among varying age, sex, ethnic and urban/rural groups? This question constituted one of the primary concerns of this study. To measure basic valuations and perceptions of animals, a typology of attitudes toward animals was used, developed during previous research on adult relationships to animals. Brief definitions of the nine attitudes types are indicated in Table 10, although more thorough delineations of the attitude concepts can be found elsewhere (Kellert, 1980). Scales were developed to measure each of the attitudes, as indicated in the methodology chapter. The relative independence of the attitude scales was suggested by scale intercorrelations of .30 and less with the exception of the negativistic and naturalistic, and negativistic and ecologistic attitudes, which correlated at the -.48 level (Table 11). Unfortunately, it proved impossible to develop an adequate aesthetic scale, a result similarly encountered in the adult study.

The relative occurrence of the eight attitudes among the children was roughly determined by three measures: a frequency distribution of varying attitude scale scores, the slope of the regression line of these frequency distributions, and standardized attitude scale mean scores. These varying results are indicated in Figure 2.

According to this analysis, the most common attitude toward animals among children was the humanistic attitude. This attitude had the highest mean score, lowest slope figure (somewhat indicative of a more dispersed and gentler frequency distribution), and included more children in the higher scoring ranges (although as Figure 4 suggests, a number of widely varying mo-

Table 10

ATTITUDES TOWARD ANIMALS

NATURALISTIC:	PRIMARY INTEREST AND AFFECTION FOR WILDLIFE AND THE OUTDOORS.
ECOLOGISTIC:	PRIMARY CONCERN FOR THE ENVIRONMENT AS A SYSTEM, FOR INTERRELATIONSHIPS BETWEEN WILDLIFE SPECIES AND NATURAL HABITATS.
HUMANISTIC:	PRIMARY INTEREST AND STRONG AFFECTION FOR INDIVIDUAL ANIMALS, PRINCIPALLY PETS.
MORALISTIC:	PRIMARY CONCERN FOR THE RIGHT AND WRONG TREATMENT OF ANIMALS, WITH STRONG OPPOSITION TO EXPLOITATION OR CRUELTY TOWARD ANIMALS.
SCIENTISTIC:	PRIMARY INTEREST IN THE PHYSICAL ATTRIBUTES AND BIOLOGICAL FUNCTIONING OF ANIMALS.
AESTHETIC:	PRIMARY INTEREST IN THE ARTISTIC AND SYMBOLIC CHARACTERISTICS OF ANIMALS.
UTILITARIAN:	PRIMARY CONCERN FOR THE PRACTICAL AND MATERIAL VALUE OF ANIMALS OR THE ANIMAL'S HABITAT.
DOMINIONISTIC:	PRIMARY INTEREST IN THE MASTERY AND CONTROL OF ANIMALS TYPICALLY IN SPORTING SITUATIONS.
*NEGATIVISTIC:	PRIMARY ORIENTATION AN ACTIVE AVOIDANCE OF ANIMALS DUE TO INDIFFERENCE, DISLIKE OR FEAR.

*HYPOTHETICALLY, THE NEGATIVISTIC ATTITUDE CAN BE DIVIDED INTO 2 ATTITUDE TYPES: A NEUTRALISTIC ATTITUDE REFLECTING A PASSIVE AVOIDANCE OF ANIMALS DUE TO INDIFFERENCE; AND, A NEGATIVISTIC ATTITUDE CHARACTERIZED BY DISLIKE AND FEAR OF ANIMALS. IN THIS RESEARCH, ONLY ONE ENCOMPASSING ATTITUDE HAS BEEN CONSIDERED.

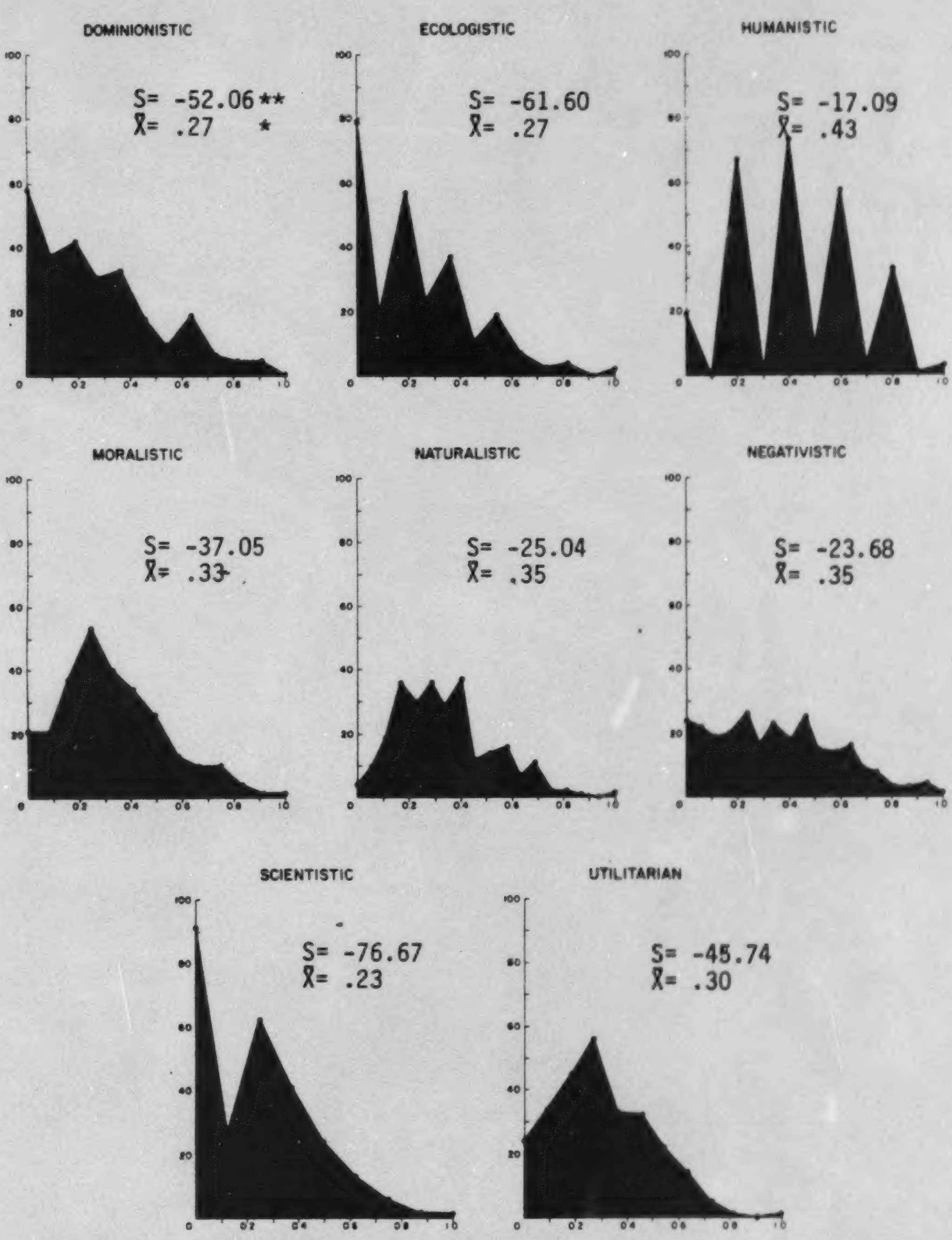
Table 11

ATTITUDE SCALE CORRELATION MATRIX

	DOMINIONISTIC	ECOLOGISTIC	HUMANISTIC	MORALISTIC	NATURALISTIC	NEGATIVISTIC	SCIENTISTIC	UTILITARIAN
DOMINIONISTIC	▨	-.134	.017	-.115	-.116	.278	.292	.240
ECOLOGISTIC	-.134	▨	-.007	.183	.293	-.481	-.056	-.053
HUMANISTIC	.017	-.007	▨	.140	.192	-.066	.017	-.128
MORALISTIC	-.115	.183	.140	▨	.286	-.124	-.018	-.264
NATURALISTIC	-.116	.293	.192	.286	▨	-.481	.170	-.167
NEGATIVISTIC	.278	-.481	-.066	-.124	-.481	▨	.112	.228
SCIENTISTIC	.292	-.056	.017	-.018	.170	.112	▨	.166
UTILITARIAN	.240	-.053	-.128	-.264	-.167	.228	.166	▨

Figure 2

FREQUENCY DISTRIBUTIONS AND MEAN SCORES OF ATTITUDE SCALES, CHILDREN



Vertical Axis: No. of Children Horizontal Axis: Standardized Mean Score

* $\bar{x}$ = Mean Score

** s = Slope of the regression line that best "fits" the frequency distribution dal points occurred). Also indicative of the relative "popularity" of the humanistic attitude was the finding of "loveable animals" as the most preferred type of animal, cited by 39% of the children (Table 12). In general, strong emotional affection for individual animals, and a general tendency toward anthropomorphic attachments to animals, appeared to be the most typical animal-related perception of the children surveyed.

The second and third most frequently occurring attitudes were the naturalistic and negativistic (Figures 2, 4 and 5). These attitudes were negatively correlated, suggesting two somewhat conflicting perspectives of animals as relatively common among children in our society. The relative "popularity" of the naturalistic perspective was additionally indicated by "animals in the woods" ranking as the second most preferred type of animal, cited by 32% of the children. The relatively common occurrence of the negativistic perspective was suggested by 51% of the children reporting a fear of snakes.

The moralistic attitude ranked fourth in overall frequency of occurrence (Figures 2 and 6). Concern for the ethical treatment of animals among the children was suggested by 70% objecting to the harvesting of wild animals for their fur. Additionally, only 26% supported hunting for recreation or sport purposes, 80% opposed hunting for sporting purposes only, and 91% objected to trophy hunting.

The utilitarian attitude was fifth in relative "popularity" (Figures 2 and 7). The greater frequency of the humanistic and naturalistic attitudes suggests children tend to appreciate animals more for their recreational and emotional benefits than for their practical significance. Only 9% of the children cited "useful" animals as their favorite type of animal.

Figure 3

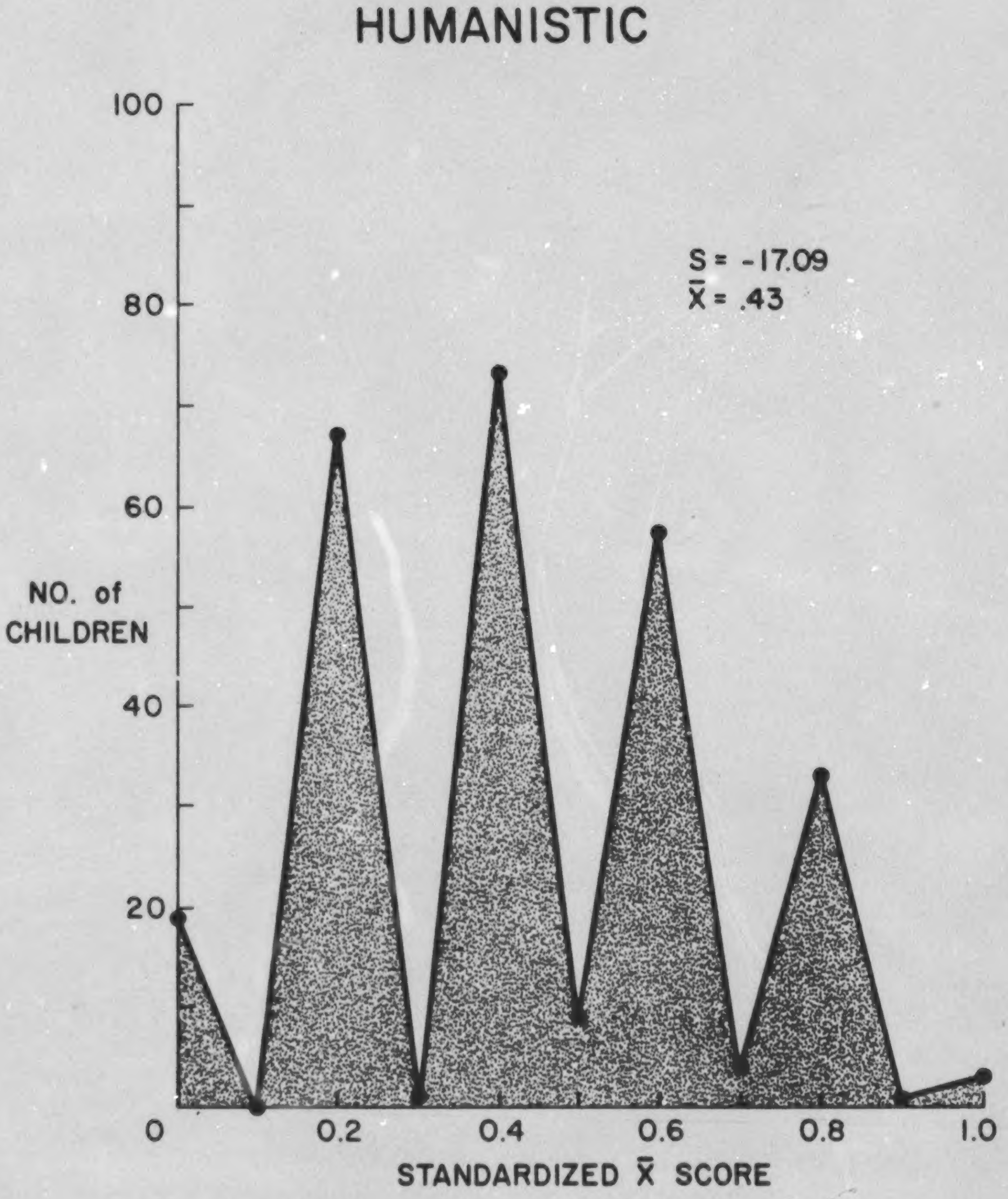

HUMANISTIC
100
80
60
40
20
0
NO. of CHILDREN
S = -17.09
X̄ = .43
0.2
0.4
0.6
0.8
1.0
STANDARDIZED X̄ SCORE

TABLE 12

WHICH TYPE OF ANIMAL DO YOU LIKE THE MOST?

BEAUTIFUL ANIMALS	11.7%
USEFUL ANIMALS	8.8
ANIMALS THAT SCIENTISTS STUDY	5.6
LOVEABLE ANIMALS	38.8
ANIMALS IN SPORTS	9.1
ANIMALS IN THE WOODS	22.8
ANIMALS THAT ARE IMPORTANT TO THE BALANCE OF NATURE	4.2

Figure 4

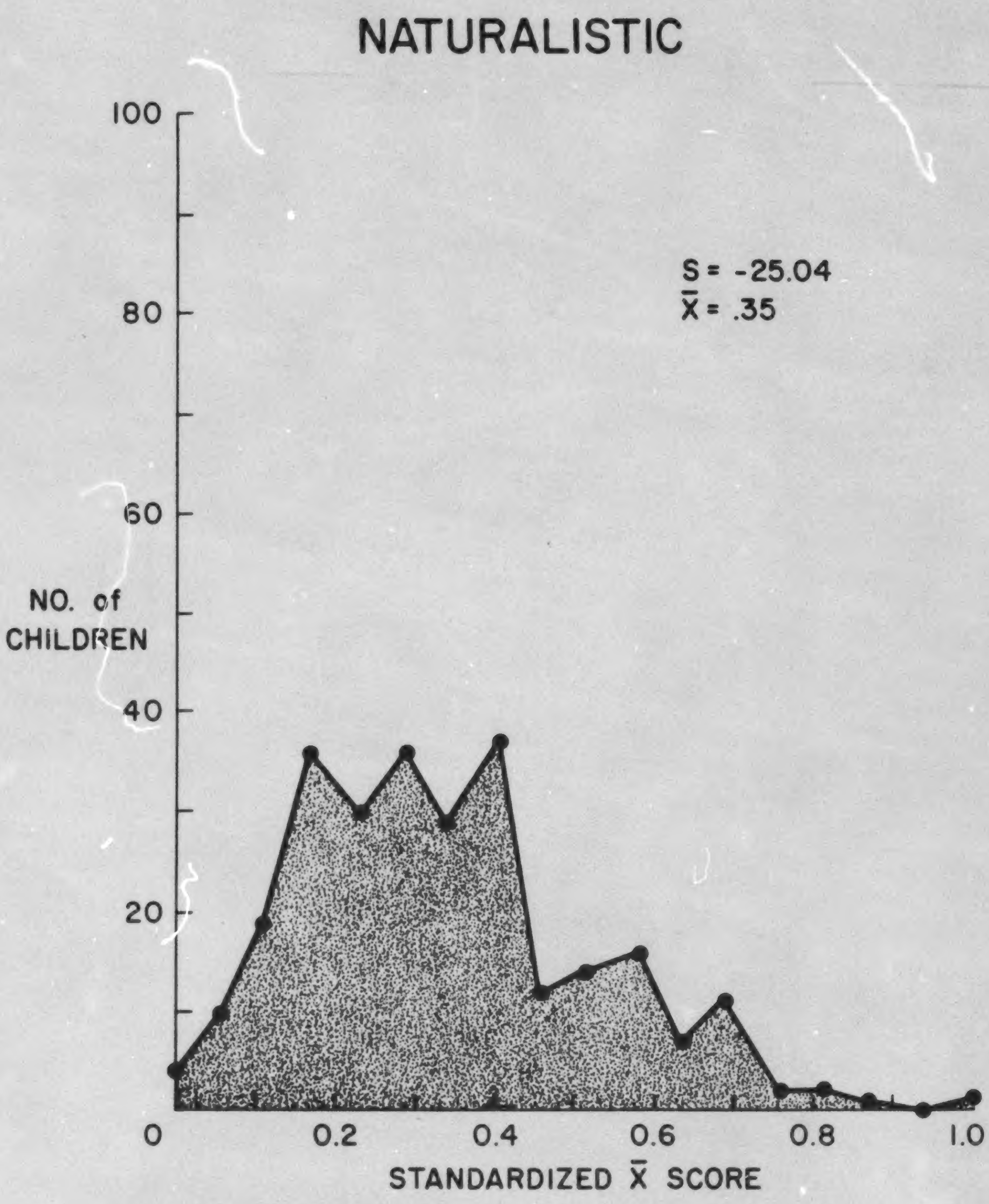

NATURALISTIC
100
80
60
40
20
0
NO. of CHILDREN
S = -25.04
X̄ = .35
0.2
0.4
0.6
0.8
1.0
STANDARDIZED X̄ SCORE

Figure 5

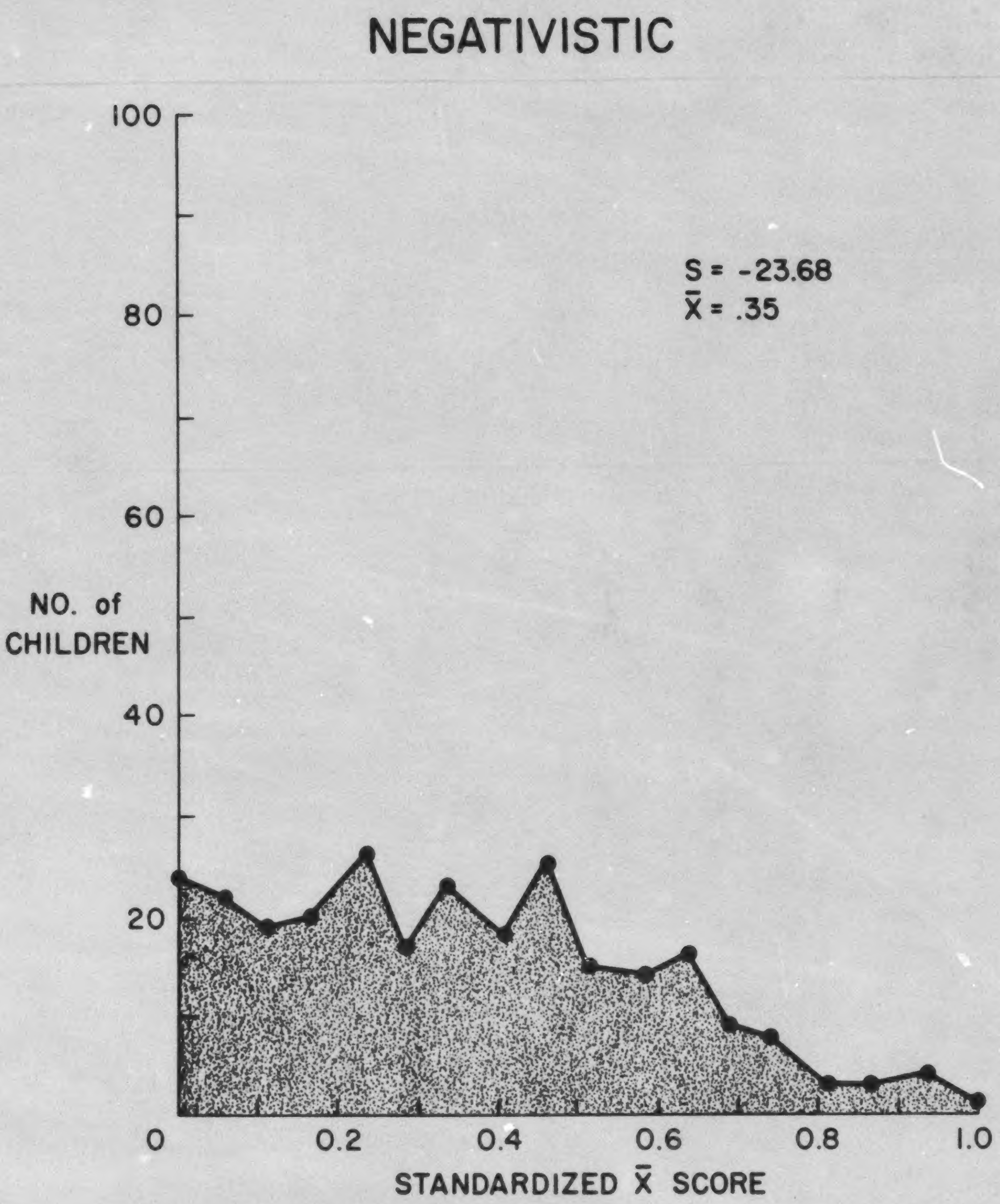

NEGATIVISTIC
S = -23.68
X̄ = .35
100
80
60
40
20
0
NO. of CHILDREN
0.2
0.4
0.6
0.8
1.0
STANDARDIZED X̄ SCORE

Figure 6

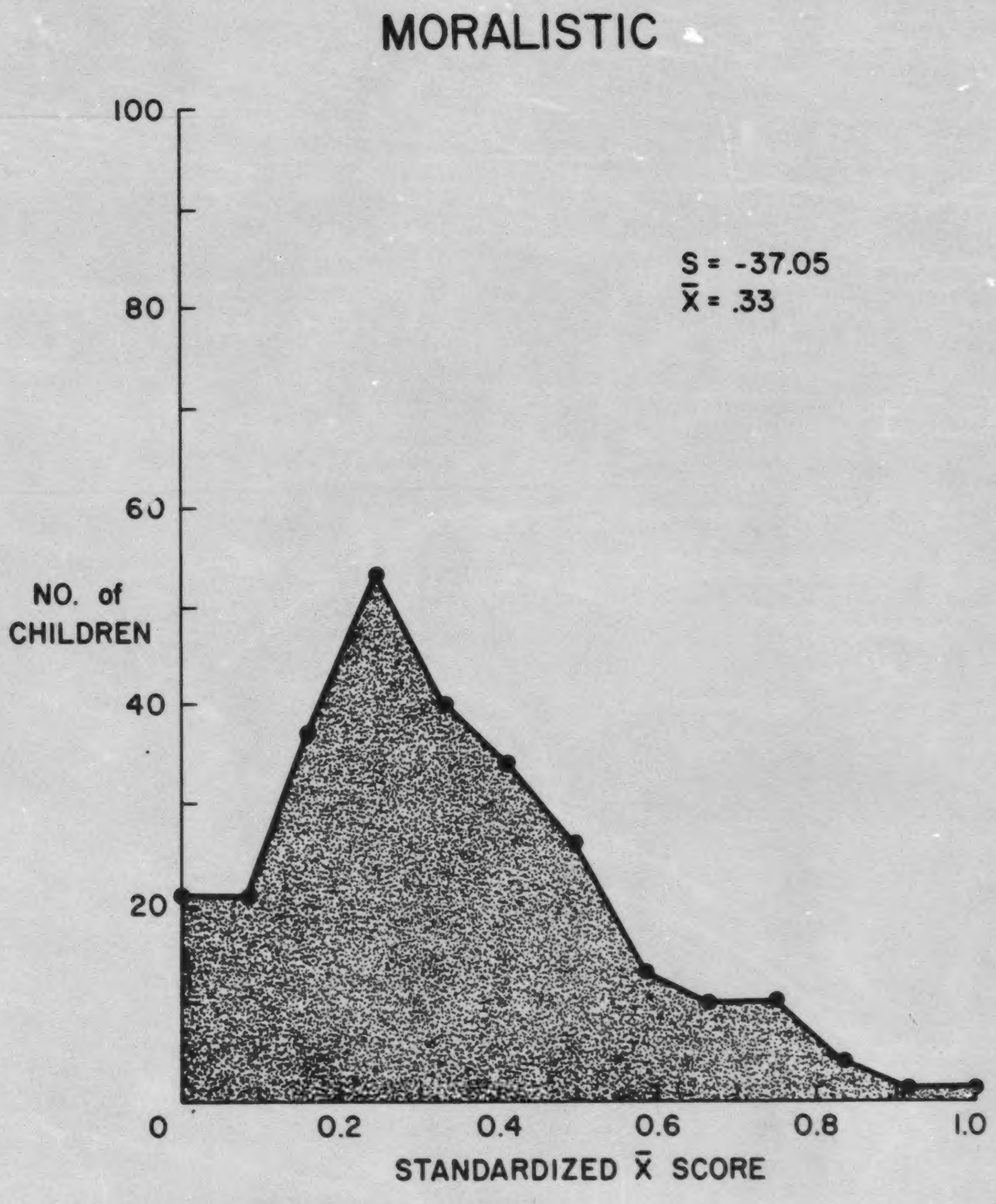
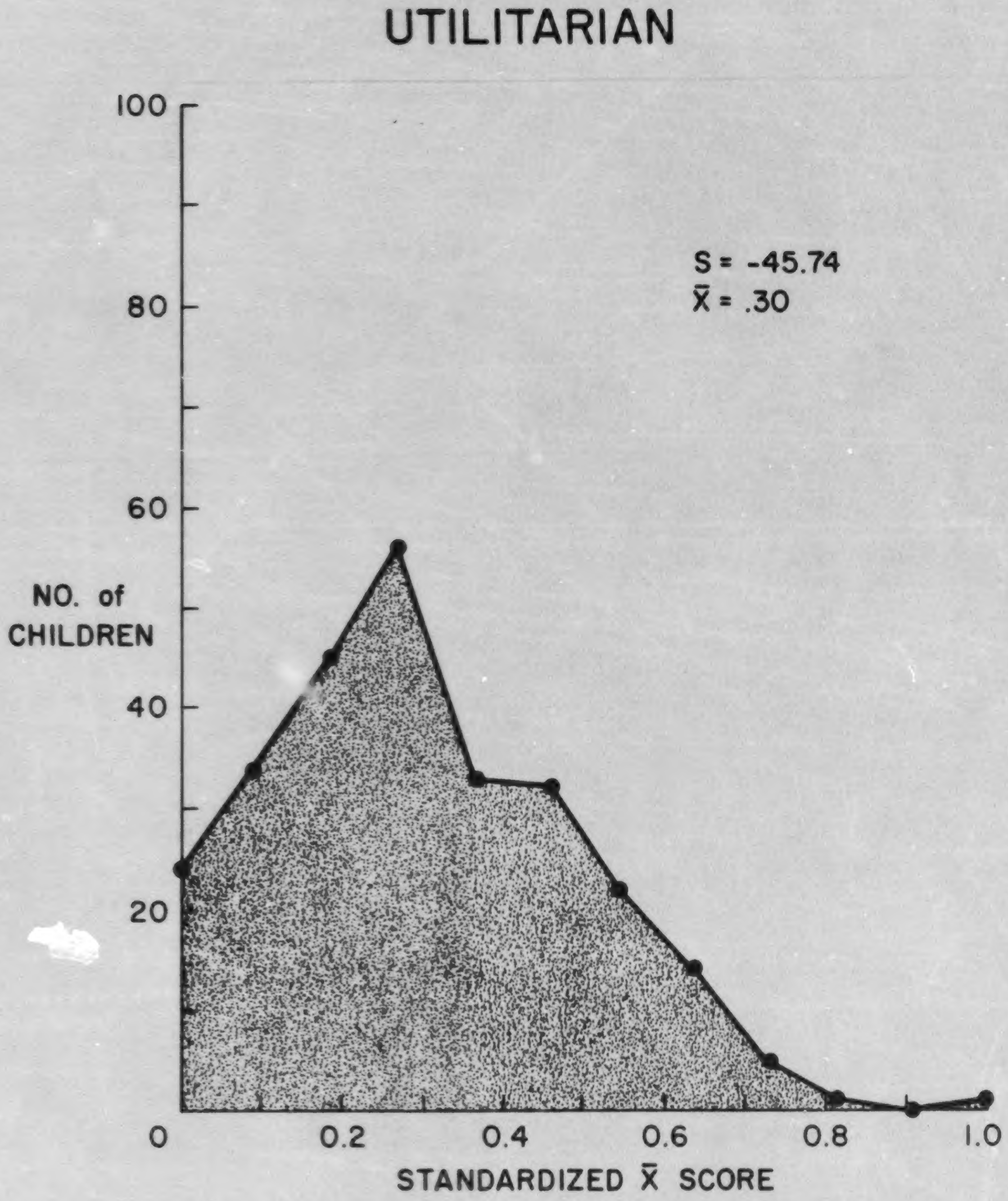

MORALISTIC
100
80
60
40
20
0
NO. of CHILDREN
S = -37.05
$\bar{X}$ = .33
0.2
0.4
0.6
0.8
1.0
STANDARDIZED $\bar{X}$ SCORE

Figure 7


UTILITARIAN
S = -45.74
$\bar{X}$ = .30
NO. of CHILDREN
100
80
60
40
20
0
0.2
0.4
0.6
0.8
1.0
STANDARDIZED $\bar{X}$ SCORE

The dominionistic attitude was relatively uncommon, ranking sixth in frequency of occurrence (Figures 2 and 8). Its comparative rarity was also suggested by only 40.5% of the children approving of firmly disciplining a dog so that it obeys every command.

The least frequently occurring attitudes were the ecologistic and scientistic (Figures 2, 9 and 10). The tendency for each attitude to emphasize a conceptual and factual understanding of animals suggests intellectual and cognitive perspectives of animals are somewhat uncommon among children in our society. The rarity of the scientistic attitude was reflected in "scientifically interesting animals" being cited by only 6% of the children as their favorite type of animal. The uncommonness of the ecologistic attitude was suggested by a typical reaction of indifference or confusion to the ecologistic film testing segments. Additionally, animals "important to the balance of nature" was cited by only 4% of the children as their favorite type of animal.

Children's attitude scale results were contrasted with similar results from the adult study. Despite widely varying methodologies, some striking similarities occurred, as suggested by Table 13. In both studies, the humanistic attitude was the most frequent perspective of animals. Additionally, the negativistic and moralistic attitudes were among the four most frequent attitudes among both children and adults; and, the dominionistic, ecologistic and scientistic attitudes were similarly rare in both studies.

The most striking difference of the two studies was the widely varying occurrence of the naturalistic and utilitarian attitudes among children. The

Figure 8

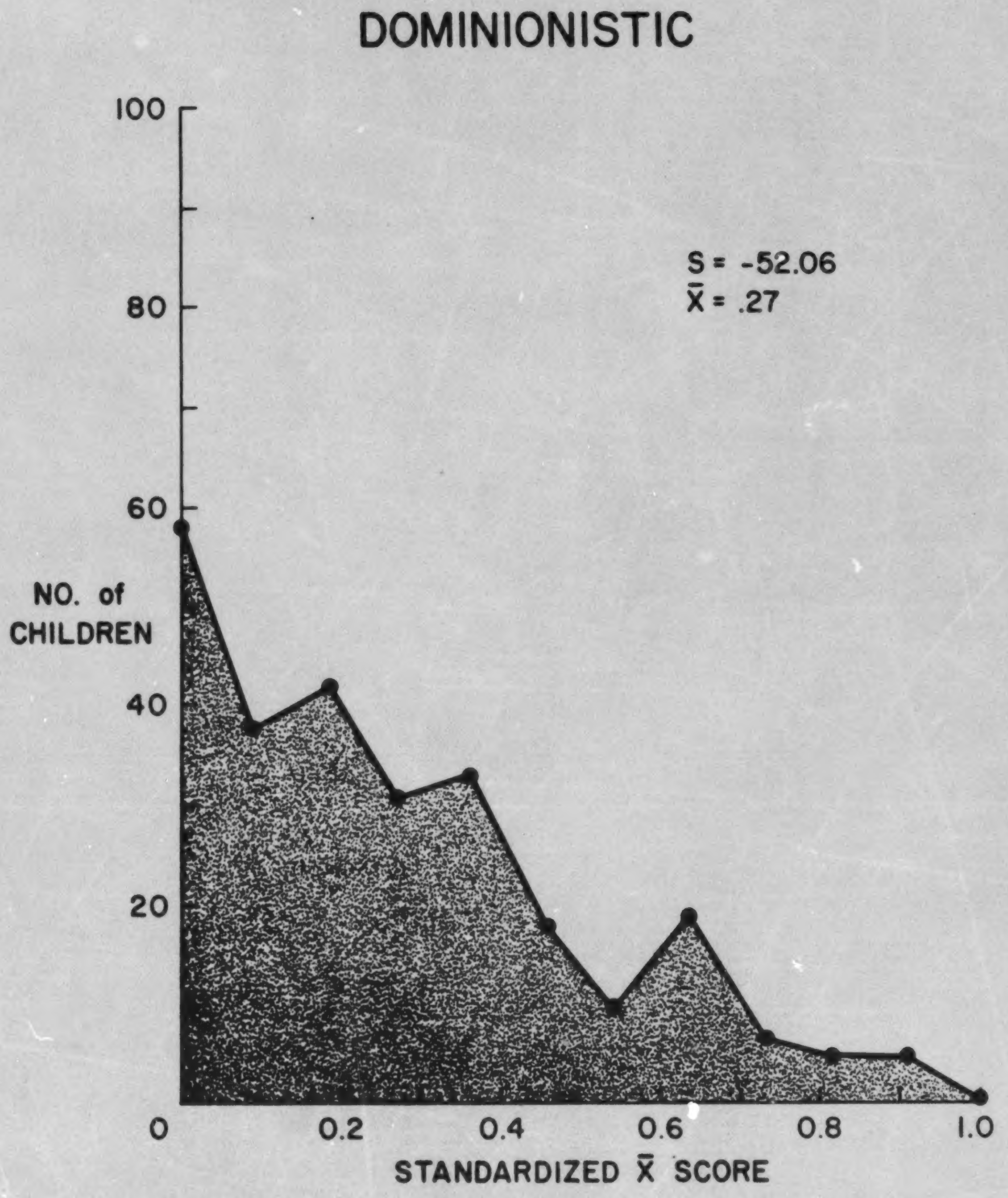

DOMINIONISTIC
S = -52.06
$\bar{X}$ = .27
100
80
60
40
20
0
NO. of CHILDREN
0.2
0.4
0.6
0.8
1.0
STANDARDIZED $\bar{X}$ SCORE

Figure 9

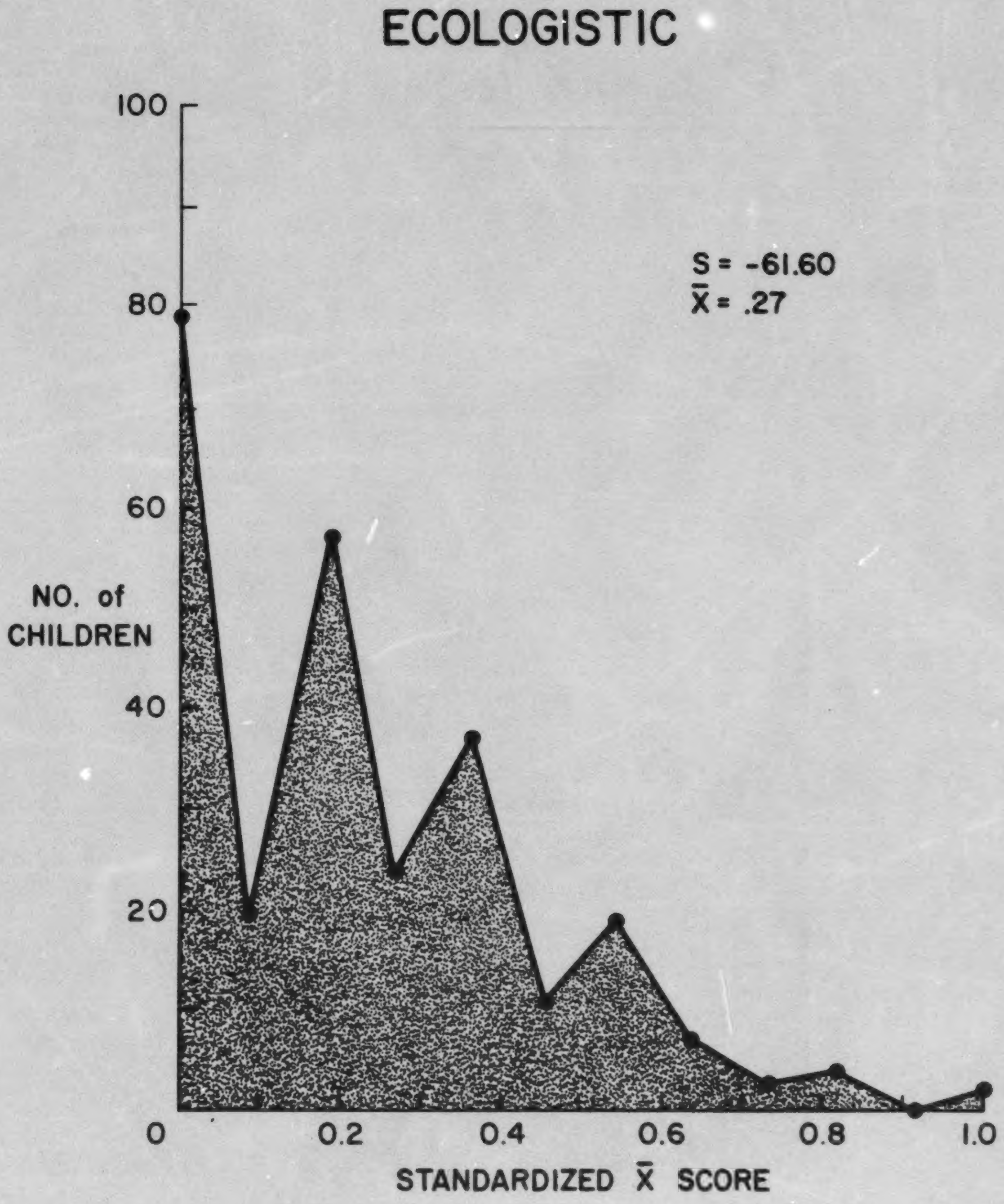

ECOLOGISTIC
S = -61.60
X̄ = .27
NO. of CHILDREN
100
80
60
40
20
0
0.2
0.4
0.6
0.8
1.0
STANDARDIZED X̄ SCORE

Figure 10

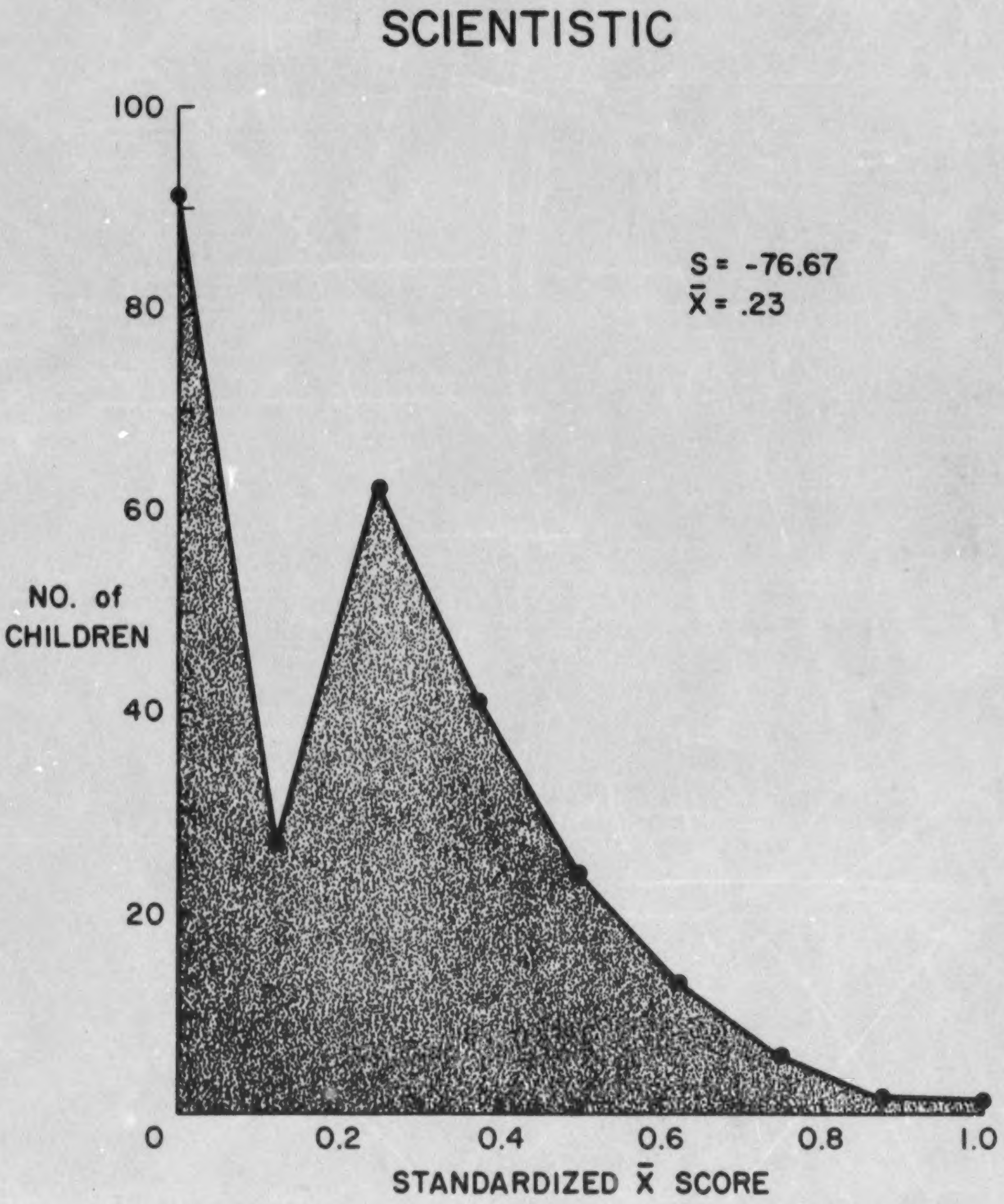

SCIENTISTIC
S = -76.67
X̄ = .23
100
80
60
40
20
0
NO. of CHILDREN
0.2
0.4
0.6
0.8
1.0
STANDARDIZED X̄ SCORE

TABLE 13

NATIONAL SAMPLE -- 18 YEARS AND OLDER; CHILDRENS SAMPLE -- 2ND, 5TH, 8TH, 11TH GRADES BY ATTITUDE SCALE MEAN SCORES, SLOPE OF SCALE FREQUENCY DISTRIBUTION AND RANK OF OCCURRENCE

	NATIONAL			CHILDREN		
	$\bar{X}$	SLOPE BASED ON ACTUAL RESPONSE RANGES	RANK OF OCCURRENCE	$\bar{X}$	SLOPE BASED ON ACTUAL RESPONSE RANGES	RANK OF OCCURRENCE
DOMINIONISTIC	.14	-746.08	7	.27	-52.06	5
ECOLOGISTIC	.22	-603.25	5	.27	-61.60	5
HUMANISTIC	.36	-359.86	1	.43	-17.09	1
MORALISTIC	.27	-375.90	3	.33	-37.05	4
NATURALISTIC	.20	-578.32	6	.35	-25.04	2
NEGATIVISTIC	.28	-456.61	2	.35	-23.68	2
SCIENTISTIC	.10	-1143.45	8	.23	-76.67	8
UTILITARIAN	.23	-398.21	4	.30	-45.74	4

naturalistic attitude was far more common among children than adults, suggesting a strong appreciation of animals and the out-of-doors is more characteristic of younger people in our society. This difference was especially pronounced when comparing 11th graders with adults. Additionally, 23% of the children cited "animals in the woods" as their favorite type of animal compared to 17% of adults; and, 57% of all children and 75% of 11th graders reported a preference for camping near wildlife compared to 36% of adults. Seventy-nine percent of children in contrast to 41% of adults further reported a desire to see wildlife in the jungles of South America or New Guinea (Table 14).

The children were also far less materially and pragmatically oriented to animals than aduits. In addition to utilitarian scale differences, 85% of adults supported the hunting of animals for their meat compared to 60% of the children, and 64% of adults approved of hunting for recreation and meat purposes compared to 26% of the children (Table 15). Seventy-three percent of adults also approved of eliminating coyotes known to have killed livestock in contrast to less than 50% of children (Table 16); and, 77% of adults approved of harvesting nonendangered whales for practical reasons compared to 51% of the children (Table 17).

DEMOGRAPHIC DIFFERENCES

Some impressive differences in basic attitudes toward animals occurred among children distinguished by age, sex, ethnicity and urban/rural status. The influence of socioeconomic status would have been examined, but distinguishing the children on this variable proved impossible due to the difficulty of obtaining the necessary information from the various school

Table 14

COMPARISON OF CHILDREN'S SAMPLE AND NATIONAL SURVEY OF ADULTS* ON QUESTION: I WOULD REALLY LIKE TO SEE WILD ANIMALS IN THE JUNGLES OF SOUTH AMERICA.**

	AGREE	DISAGREE	TOTAL NUMBER RESPONDENTS
CHILDREN	79.1	11.3	267
ADULTS	41.3	56.8	2455

*ADULT STUDY QUESTION WAS:"I HAVE LITTLE DESIRE TO SEE WILD ANIMALS IN PLACES LIKE THE JUNGLES OF SOUTH AMERICA OR NEW GUINEA."

**IT WAS NOT POSSIBLE TO PERFORM STATISTICAL SIGNIFICANCE TESTS ON THIS AND SIMILAR DATA DUE TO DIFFERENCES IN SAMPLING AND QUESTION WORDING.

TABLE 15

COMPARISON OF CHILDREN'S SAMPLE AND NATIONAL ADULT SURVEY ON APPROVAL OF DIFFERENT TYPES OF HUNTING

	AGREE	DISAGREE	TOTAL NUMBER RESPONDENTS
HUNTING ANIMALS FOR FOOD*			
CHILDREN	59.6%	30.3	267
ADULTS	85.2	13.7	2455
HUNTING ANIMALS FOR FOOD AND FUN*			
CHILDREN	25.8	49.8	267
ADULTS	64.2	34.1	2455

*ADULT STUDY QUESTION WAS: "OF THE FOLLOWING REASONS FOR HUNTING WHICH DO YOU APPROVE OF OR OPPOSE?" 2 OF THE OPTIONS WERE: HUNTING FOR MEAT AND HUNTING FOR RECREATION AND MEAT.

Table 16

COMPARISON OF CHILDREN'S SAMPLE AND NATIONAL SURVEY OF ADULTS* ON QUESTION: SOMETIMES FARMERS LOSE A LOT OF MONEY BECAUSE FOXES KILL THEIR CHICKENS. WHAT SHOULD THE FARMERS DO WITH THESE FOXES?

	AGREE	DISAGREE	TOTAL NUMBER RESPONDENTS
KILL ALL THE FOXES.			
CHILDREN	15.4	78.6	267
ADULTS	41.2	55.9	2455
ONLY GET RID OF THE FOXES THEY KNOW KILLED THE CHICKENS			
CHILDREN	49.8	37.4	267
ADULTS	73.2	23.6	2455

*ADULT STUDY QUESTION WAS: "SOME RANCHERS CLAIM SUBSTANTIAL ECONOMIC LOSS BECAUSE COYOTES KILL THEIR SHEEP. WHICH METHODS WOULD YOU APPROVE OF USING TO CORRECT THIS SITUATION?" 2 OF THE OPTIONS WERE: "SHOOT OR TRAP AS MANY COYOTES AS POSSIBLE;"AND,"WHENEVER POSSIBLE, HUNT ONLY INDIVIDUAL COYOTES KNOWN TO HAVE KILLED LIVESTOCK."

Table 17

COMPARISON OF CHILDREN'S SAMPLE AND NATIONAL SURVEY OF ADULTS* ON QUESTION: IT'S OK TO HUNT WHALES FOR FOOD AS LONG AS THERE ARE ALOT OF THEM LEFT IN THE WORLD.

	AGREE	DISAGREE	TOTAL NUMBER RESPONDENTS
CHILDREN	50.9	36.3	267
ADULTS	77.0	20.7	2455

*ADULT STUDY QUESTION WAS: "I THINK IT'S ALRIGHT TO KILL WHALES FOR A USEFUL PRODUCT AS LONG AS THE ANIMALS ARE NOT THREATENED WITH EXTINCTION."

systems.

NATURALISTIC ATTITUDE

Naturalistic attitude differences were not great among the demographic groups, with the exception of large age variations (Table 18 and Figure 11). Older children, especially 11th graders, revealed far more interest in wildlife and the out-of-doors. Moreover, eleventh grade males had the highest naturalistic scores of all demographic groups. The greater naturalistic attitude of 11th graders was reflected in 31% of this group citing "animals in the woods" as their favorite type of animal compared to 16% of second graders. Fifty-nine percent of 11th graders also indicated a preference for camping near wildlife in contrast to 16% of the youngest children (Table 19). Relatedly, 76% of second graders compared to 35% of 11th graders indicated liking pets more than wildlife (Table 20).

Naturalistic scale differences among 2nd, 5th and 8th graders were not great. Slightly higher naturalistic scores unexpectedly occurred among 2nd compared to 8th graders.

Rural children had consistently higher naturalistic scale scores than other population groups, although these results were not significant. Thirty-five percent of rural children reported "animals in the woods" as their favorite type of animal compared to less than 20% of the children who lived in other residential areas.

Ethnicity was moderately related (.07 confidence figure) to a naturalistic attitude toward animals. Black children were somewhat less interested in wildlife and the natural environment than white students. Additionally, 52% of black compared to 28% of white children regarded most wild animals as

Table 18

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION RESULTS ON NATURALISTIC ATTITUDE SCALE AMONG AGE, SEX, ETHNIC AND URBAN/RURAL GROUPS

	SIG F	$\bar{X}$ SCORE	DEVIATION FROM GRAND MEAN AFTER ADJUSTING FOR INDEPENDENT AND COVARIATE VARIABLES
AGE	.01		
2ND GRADE		5.89	0.03
5TH GRADE		5.53	-0.20
8TH GRADE		5.18	-0.83
11TH GRADE		6.84	0.97
SEX	.66		
MALE		5.78	-0.13
FEMALE		5.95	0.13
ETHNICITY	.07		
WHITE		6.01	0.05
NONWHITE		5.05	-0.22
URBAN/RURAL	.16		
URBAN		5.47	-0.49
SMALL CITY		5.72	-0.09
SUBURB		5.79	-0.06
RURAL		6.61	0.67

Figure 11

NATURALISTIC SCALE MEAN SCORES BY CHILDREN DEMOGRAPHIC GROUPS

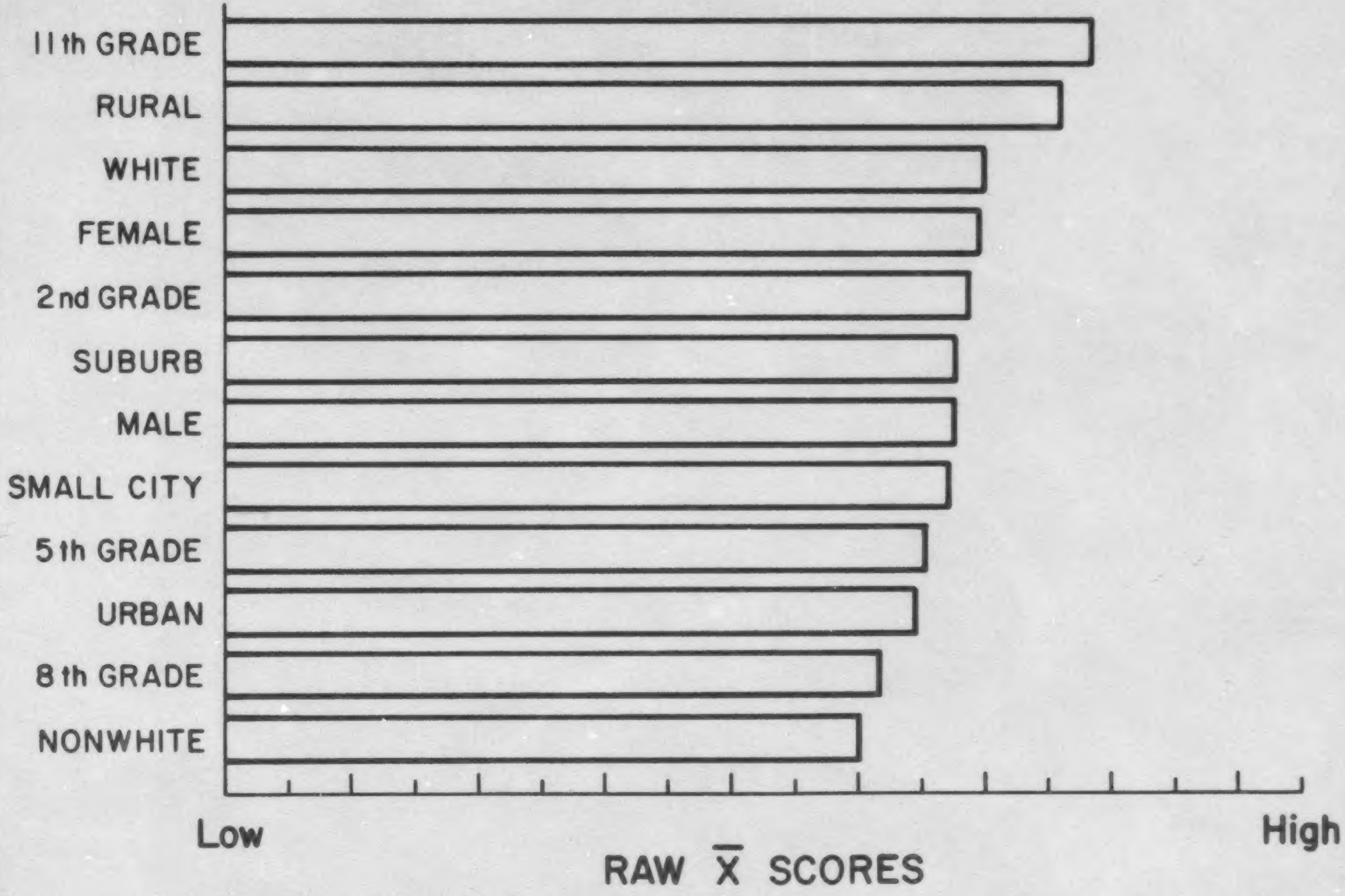


Table 19

IF I WENT CAMPING, I WOULD WANT TO STAY WHERE LOTS OF OTHER PEOPLE WERE, NOT WHERE WILD ANIMALS WERE AROUND.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
2ND GRADE	31.7	36.5	6.3	9.5
5TH GRADE	11.8	36.8	35.3	8.8
8TH GRADE	7.5	25.4	43.3	17.9
11TH GRADE	2.9	21.7	52.2	7.2
ALL CHILDREN	13.1	30.0	34.8	10.9

$x^2 = 59.28^*$ $P = < .001$

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*SIGNIFICANCE TESTS ONLY APPLY TO THE AGE GROUPS. THIS SAME PROCEDURE OCCURS ON ALL OTHER TABLES.

Table 20

I LIKE PET ANIMALS LIKE DOGS AND CATS MORE THAN I LIKE WILD ANIMALS.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
2ND GRADE	58.1	17.7	6.5	8.1
5TH GRADE	16.2	36.8	26.5	1.5
8TH GRADE	11.9	41.8	16.4	7.5
11TH GRADE	4.3	30.4	36.2	2.9
ALL CHILDREN	21.8	32.0	21.8	4.9

$x^2 = 81.61$ $P = < .001$

dangerous to humans; and, 71% of black versus 36% of white children reported a preference for modern campgrounds rather than isolated areas in proximity to wildlife (Table 21).

Male/female differences on the naturalistic attitude scale were not significant, although 39% of male compared to 15% of female children cited "animals in the woods" as their favorite type of animal.

HUMANISTIC ATTITUDE

Significant humanistic differences occurred among male/female and black/white children. Female humanistic scale scores, especially among 2nd and 11th graders, were the highest of any group after adjusting for the interactive effects of other demographic variables (Table 22, Figure 12). Females in the national adult study also had significantly higher humanistic scores than males. The strong affection for animals of female children was reflected in 55% citing "loveable animals" as their prefered type of animal in contrast to 22% of male children.

Black children had the lowest humanistic scores of all demographic groups. Strong emotional attachment to pets or a sense of "loving" animals were substantially less encountered sentiments among nonwhite children.

Although age group differences on the humanistic scale were not significant, 2nd graders obtained relatively higher scores. Additionally, a greater emotional attachment to pets among younger children was reflected in 76% of 2nd graders preferring pets to wildlife compared to 53% of 5th, 54% of 8th and 35% of 11th graders. Nearly 51% of the youngest children also reported "loveable" animals as their favorite type of animal compared to 44% of 5th, 27% of 8th and 22% of 11th graders. Finally, on a number of film

Table 21

IF I WENT CAMPING, I WOULD WANT TO STAY WHERE LOTS OF OTHER PEOPLE WERE, NOT WHERE WILD ANIMALS WERE AROUND.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
WHITE	11.6	24.6	38.2	13.0
NONWHITE	19.0	52.4	19.0	2.4

$x^2 = 30.25$ $P = .003$

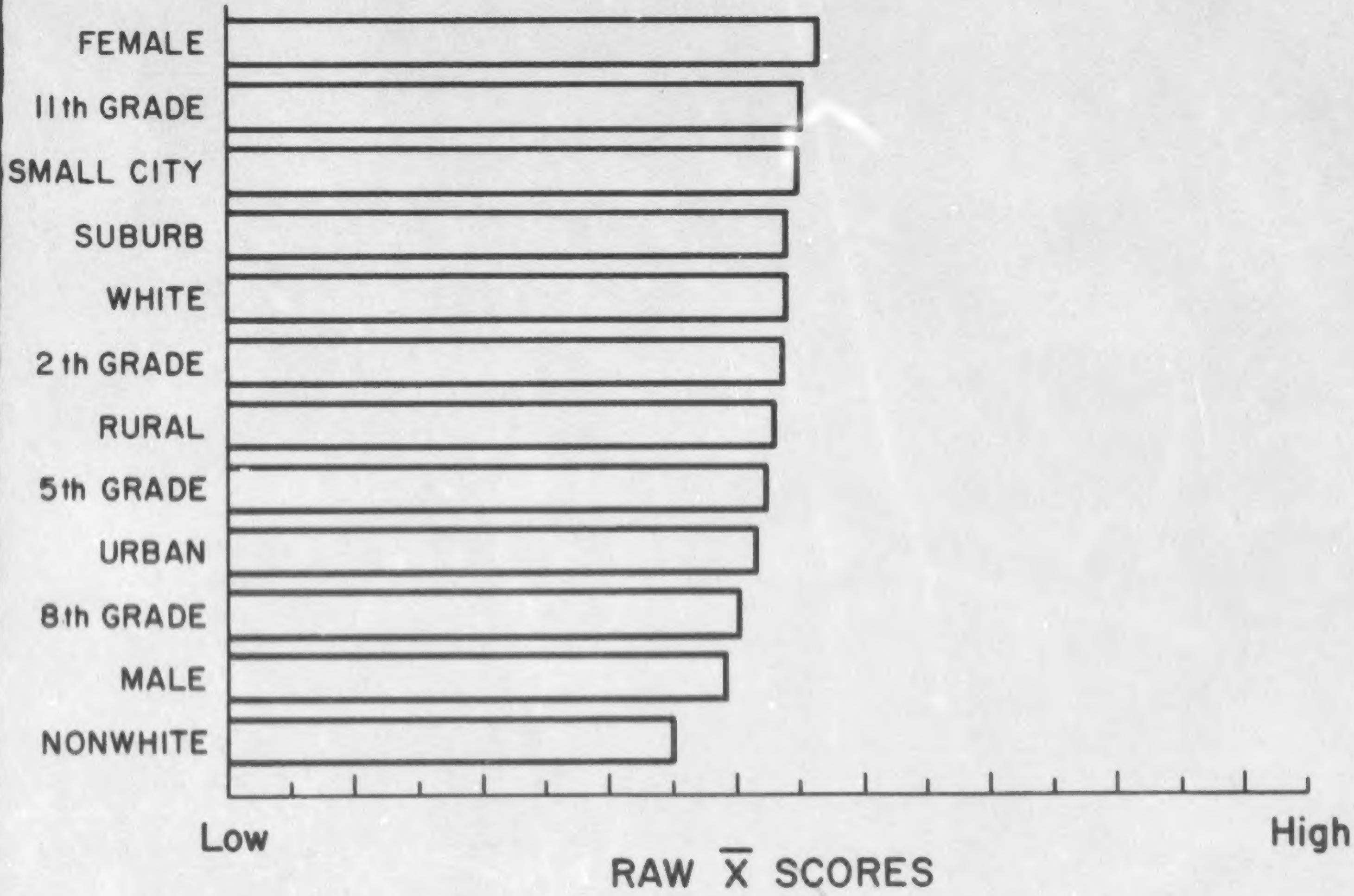
Table 22

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION RESULTS ON HUMANISTIC ATTITUDE SCALE AMONG AGE, SEX, ETHNIC AND URBAN/RURAL GROUPS

	SIG F	$\bar{X}$ SCORE	DEVIATION FROM GRAND MEAN AFTER ADJUSTING FOR INDEPENDENT AND COVARIATE VARIABLES
AGE	.67		
2ND GRADE		4.37	0.16
5TH GRADE		4.26	-0.02
8TH GRADE		4.03	-0.12
11TH GRADE		4.52	-0.03
SEX	.01		
MALE		3.93	-0.35
FEMALE		4.65	0.34
ETHNICITY	.02		
WHITE		4.41	0.19
NONWHITE		3.50	-0.94
URBAN/RURAL	.84		
URBAN		4.15	0.18
SMALL CITY		4.49	-0.01
SUBURB		4.42	-0.04
RURAL		4.30	-0.15

Figure 12

HUMANISTIC SCALE MEAN SCORES BY CHILDREN DEMOGRAPHIC GROUPS



questions, 2nd graders consistently indicated a greater interest than older children in owning and playing with pet animals.

NEGATIVISTIC ATTITUDE

Significant differences occurred for every demographic variable on the negativistic attitude scale (Table 23, Figure 13). Age, ethnic and sex variations were especially striking, and urban/rural differences were significant at the .04 confidence level.

Progressively higher negativistic attitude scores were found among younger age children. 2nd and 5th graders, in particular, revealed far more fear, indifference and dislike for animals, especially in comparison to 11th graders. These results strongly contrasted with the national adult study, where significantly higher negativistic scores occurred among over 65 year old respondents particularly in contrast to 18 - 35 year olds.

Second graders, especially second grade females,had the highest negativistic scores of any demographic group. Greater fear and indifference to animals among younger children were also suggested by a number of individual question results. For example, 62% of second graders reported a fear of snakes compared to 42% of 11th graders (Table 24); 63% of the youngest children favored eliminating all poisonous snakes in contrast to 19% of 5th, 7.5% of 8th and 6% of 11th grade children (Table 25). Forty percent of 2nd graders also expressed a belief that it was "silly" for people to love animals as much as people (Table 26); a majority reported a fear of big dogs (Table 27); and most expressed the view that wild animals are dangerous to people (Table 28). In contrast, only a minority of older children agreed with these questions. Finally, on a variety of film questions, younger

Table 23

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION RESULTS ON NEGATIVISTIC ATTITUDE SCALE AMONG AGE, SEX, ETHNIC AND URBAN/RURAL GROUPS

	SIG F	$\bar{X}$ SCORE	DEVIATION FROM GRAND MEAN AFTER ADJUSTING FOR INDEPENDENT AND COVARIATE VARIABLES
AGE	.00		
2ND GRADE		8.79	2.87
5TH GRADE		6.29	0.12
8TH GRADE		5.12	-0.87
11TH GRADE		4.04	-1.98
SEX	.00		
MALE		5.18	-0.88
FEMALE		6.80	0.85
ETHNICITY	.00		
WHITE		5.58	-0.16
NONWHITE		7.60	0.79
URBAN/RURAL	.04		
URBAN		6.75	0.61
SMALL CITY		5.85	0.41
SUBURB		6.29	-0.32
RURAL		4.91	-0.68

Figure 13

NEGATIVISTIC SCALE MEAN SCORES BY CHILDREN DEMOGRAPHIC GROUPS

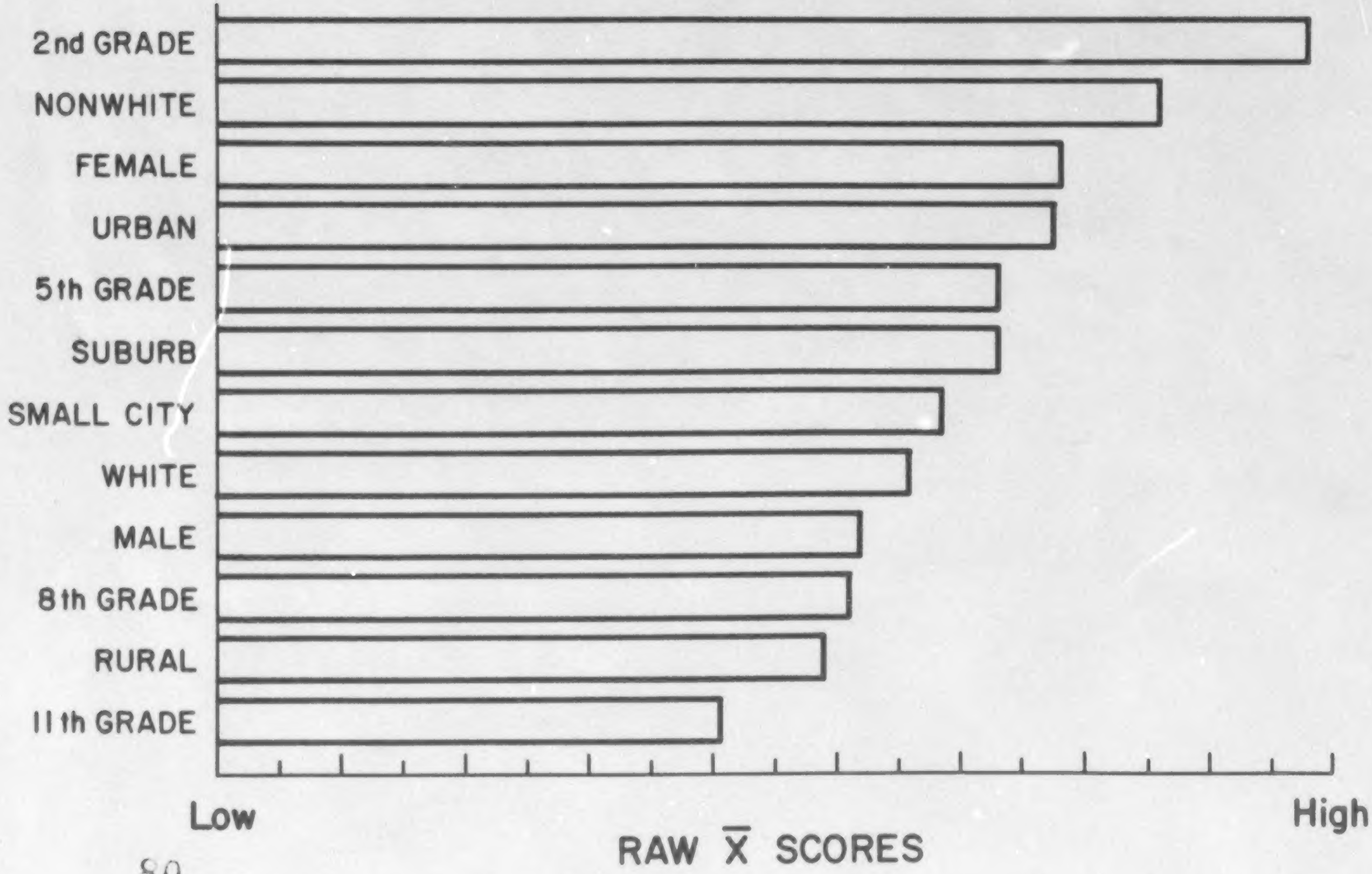


Table 24

I WOULD BE SCARED TO TOUCH A SNAKE.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
2ND GRADE	38.1	23.8	9.5	25.4
5TH GRADE	23.5	33.8	25.0	7.4
8TH GRADE	13.4	28.4	35.8	13.4
11TH GRADE	18.8	23.2	34.8	13.0
ALL CHILDREN	23.2	27.3	26.6	14.6

$x^2 = 32.29$ P = .001

Table 25

ALL POISONOUS ANIMALS LIKE RATTLESNAKES SHOULD BE GOTTEN RID OF.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
2ND GRADE	39.7	23.8	9.5	19.0
5TH GRADE	5.9	13.2	47.1	20.6
8TH GRADE	3.0	4.5	52.2	31.3
11TH GRADE	2.9	2.9	46.4	39.1
ALL CHILDREN	12.4	10.9	39.3	27.7

$x^2 = 93.42$ $P = < .001$

Table 26

I THINK IT'S SILLY WHEN PEOPLE LOVE ANIMALS AS MUCH AS THEY LOVE PEOPLE.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
2ND GRADE	15.9	25.4	20.6	28.6
5TH GRADE	4.4	7.4	44.1	27.9
8TH GRADE	0.0	11.9	58.2	26.9
11TH GRADE	0.0	1.4	43.5	50.7
ALL CHILDREN	4.9	11.2	41.9	33.7

$x^2 = 68.41$ $P = < .001$

Table 27

MOST BIG DOGS ARE SCARY TO ME.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
2ND GRADE	17.5	34.9	11.1	28.6
5TH GRADE	1.5	32.4	44.1	13.2
8TH GRADE	1.5	17.9	52.2	20.9
11TH GRADE	0.0	18.8	56.5	20.3
ALL CHILDREN	4.9	25.8	41.6	20.6

$x^2 = 57.66$ P = < .001

Table 28

MOST WILD ANIMALS ARE DANGEROUS TO PEOPLE.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
2ND GRADE	28.6	34.9	9.5	6.3
5TH GRADE	7.4	33.8	39.7	10.3
8TH GRADE	3.0	7.5	56.7	25.4
11TH GRADE	1.4	14.5	46.4	27.5
ALL CHILDREN	9.7	22.5	38.6	17.6

$x^2 = 87.63$ $P = < .001$

children tended to regard unusual and phylogenetically "lower" animals as unattractive and frightening. The consistency and strength of these results seemed to dispel certain idealized notions about the greater affinity and affection for animals of younger children.

Ethnic and sex negativistic scale differences were also very significant. Female and nonwhite children viewed animals with greater anxiety and lack of interest than male and white children. For example, 61% of female and 67% of black children, in contrast to 40% of male and 46% of white students, reported a fear of snakes (Tables 29 and 30). Additionally, a majority of black compared to 28% of white children perceived wild animals as dangerous to people (Table 31); and, 5% of white versus 21% of black children indicated a dislike of having animals close to them (Table 32).

Urban/rural differences on the negativistic scale were significant, although not striking. Variations among suburban and small city students were relatively inconsequential. The primary residential group difference was the higher negativistic scores of large city compared to rural children. Indicative of this difference, 64% of children living in large cities reported a fear of snakes in contrast to 42% of the rural children (Table 33).

MORALISTIC ATTITUDE

Insignificant moralistic differences occurred among ethnic, sex and residential groups (Table 34, Figure 14). Age differences, however, were significant, although moralistic variations among 2nd, 5th and 8th graders were relatively minor. The most outstanding result was the much greater moralistic sentiment of 11th graders, by far the highest scoring group on

Table 29

I WOULD BE SCARED TO TOUCH A SNAKE.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
WHITE	22.2	24.2	28.0	16.4
NONWHITE	19.0	47.6	19.0	9.5

$x^2 = 9.96$ $P = .041$

Table 30

I WOULD BE SCARED TO TOUCH A SNAKE.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
MALE	16.0	23.7	33.6	18.3
FEMALE	30.1	30.9	19.9	11.0

$x^2 = 14.17$ $P = .007$

Table 31

MOST WILD ANIMALS ARE DANGEROUS TO PEOPLE.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
WHITE	9.2	18.8	41.1	20.3
NONWHITE	11.9	40.5	28.6	7.1

$x^2 = 12.33 \quad P = .015$

Table 32

I DON'T LIKE MOST ANIMALS CLOSE TO ME.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
WHITE	2.9	1.9	51.2	41.5
NONWHITE	0.0	21.4	50.0	23.8

$x^2 = 30.18 \quad P = \leq .001$

Table 33

I WOULD BE SCARED TO TOUCH A SNAKE.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
RURAL	19.7	22.7	30.3	12.1
SUBURBAN	21.0	17.7	22.6	33.9
SMALL CITY	21.3	31.9	31.9	6.4
URBAN	28.6	35.2	23.1	7.7

$X^2 = 34.93$ $P = .001$

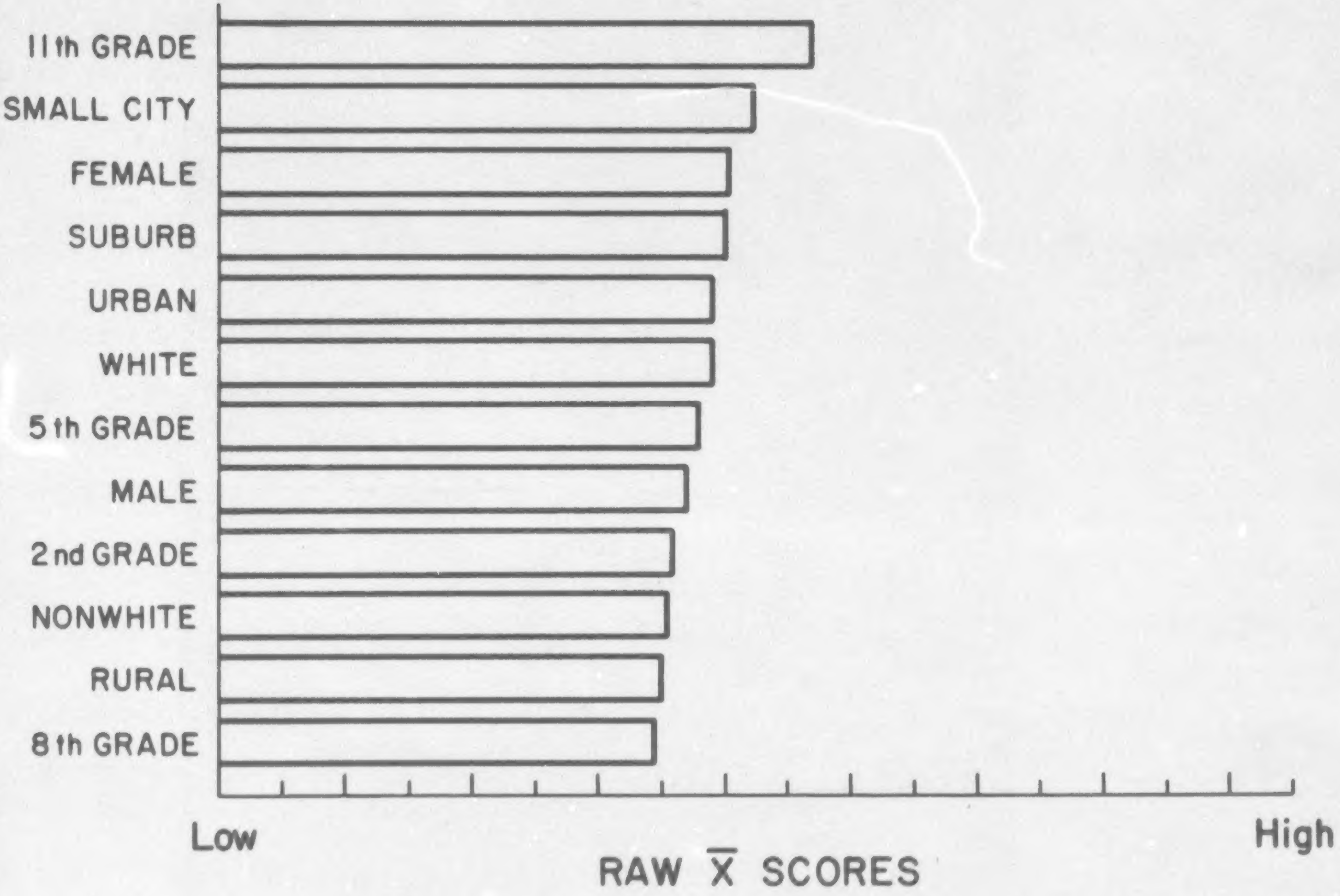
Table 34

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION RESULTS ON MORALISTIC ATTITUDE SCALE AMONG AGE, SEX, ETHNIC AND URBAN/RURAL GROUPS

	Sig F	$\bar{X}$ Score	Deviation from Grand Mean after Adjusting for Independent and Covariate Variables
AGE	.01		
2nd Grade		3.59	-0.30
5th Grade		3.79	-0.12
8th Grade		3.45	-0.36
11th Grade		4.71	0.74
SEX	.27		
Male		3.73	-0.16
Female		4.05	0.16
ETHNICITY	.39		
White		3.91	0.03
Nonwhite		3.55	-0.14
URBAN/RURAL	.43		
Urban		3.92	-0.08
Small City		4.23	0.30
Suburb		4.02	0.31
Rural		3.50	-0.40

Figure 14

MORALISTIC SCALE MEAN SCORES BY CHILDREN DEMOGRAPHIC GROUPS



this attitude scale. Greater moralistic concern among 11th graders was also suggested by 39% of this group approving of hunting nonendangered whales compared to nearly 60% of 2nd and 5th grade children, and 77% of adults in the national survey (Tables 35 and 36). Additionally, just 10% of 11th grade children, compared to 52% of 2nd graders, approved of killing nonendangered animals to make fur clothing (Table 37); and, a mere 3% of 16 year olds in contrast to 27% of the youngest children approved of hunting for sporting and recreational purposes (Table 38).

Although moralistic differences among male and female children were not significant, a number of individual question results suggested greater concern among female than male chidren for animal rights and cruelty issues. For example, 71% of male versus a minority of female children approved of hunting for food (Table 39).

UTILITARIAN ATTITUDE

Age and ethnic group results were significant on the utilitarian scale (Table 40, Figure 15). Age differences were especially striking, particularly when 2nd graders were compared with other age groups. Eleventh grade children had the lowest utilitarian scale scores of all demographic groups, in contrast to 2nd graders who had the highest scores. The reverse pattern occurred among age groups in the adult study, with respondents under 35 having far lower utilitarian scores than older persons, especially respondents over 65 years of age. The period from 16 - 35 appears, thus, to be characterized by substantially less support for the material exploitation of animals.

The greater utilitarian attitude of second graders was additionally

Table 35

IT'S OK TO HUNT WHALES FOR FOOD AS LONG AS THERE ARE ALOT OF THEM LEFT IN THE WORLD.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
2ND GRADE	27.0	31.7	12.7	15.9
5TH GRADE	2.9	57.4	22.1	7.4
8TH GRADE	0.0	46.3	26.9	10.4
11TH GRADE	4.3	34.8	37.7	11.6
ALL CHILDREN	8.2	42.7	25.1	11.2

$x^2 = 54.19$ $P = < .001$

Table 36

COMPARISON OF CHILDREN'S SAMPLE AND NATIONAL SURVEY OF ADULTS* ON QUESTION: IT'S OK TO HUNT WHALES AS FOOD AS LONG AS THERE ARE ALOT OF THEM LEFT IN THE WORLD.

	AGREE	DISAGREE	TOTAL NUMBER RESPONDENTS
CHILDREN	50.9	36.3	267
ADULTS	77.0	20.7	2455

*ADULT STUDY QUESTION WAS: "I THINK IT'S ALRIGHT TO KILL WHALES FOR A USEFUL PRODUCT AS LONG AS THE ANIMALS ARE NOT THREATENED WITH EXTINCTION."

Table 37

IT'S OK TO KILL AN ANIMAL AND USE ITS FUR TO MAKE A COAT.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
2ND GRADE	15.9	36.5	14.3	25.4
5TH GRADE	0.0	13.2	45.6	36.8
8TH GRADE	3.9	16.4	47.8	26.9
11TH GRADE	1.4	8.7	37.7	43.5
ALL CHILDREN	4.9	18.4	36.7	33.3

$X^2 = 59.92$ $P = < .001$

Table 38

HUNTING ANIMALS FOR FOOD.

	STRONGLY APPROVE	APPROVE	DISAPPROVE	STRONGLY DISAPPROVE
2ND GRADE	23.8	22.2	14.3	30.2
5TH GRADE	0.0	51.5	25.0	13.2
8TH GRADE	7.5	62.7	17.9	1.5
11TH GRADE	5.8	63.8	13.0	7.2
ALL CHILDREN	9.0	50.6	17.6	12.7

$x^2 = 63.48$ $P = < .001$

HUNTING ANIMALS FOR FUN.

	STRONGLY APPROVE	APPROVE	DISAPPROVE	STRONGLY DISAPPROVE
2ND GRADE	16.1	11.3	19.4	40.3
5TH GRADE	0.0	8.8	30.9	55.9
8TH GRADE	3.0	1.5	55.2	40.3
11TH GRADE	0.0	2.9	42.0	50.7
ALL CHILDREN	4.5	6.0	37.2	47.0

$x^2 = 57.72$ $P = < .001$

HUNTING BIG WILD ANIMALS IN AFRICA AND PUTTING HORNS ON THE WALL.

	STRONGLY APPROVE	APPROVE	DISAPPROVE	STRONGLY DISAPPROVE
2ND GRADE	12.7	12.7	15.9	39.7
5TH GRADE	1.5	2.9	44.1	45.6
8TH GRADE	1.5	3.0	55.2	34.3
11TH GRADE	0.0	1.4	29.0	66.7
ALL CHILDREN	3.7	4.9	36.3	46.8

$x^2 = 65.46$ $P = < .001$

Table 39

APPROVE HUNTING ANIMALS FOR FOOD.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
MALE	12.2	58.8	9.9	10.7
FEMALE	5.9	42.6	25.0	14.7

$x^2 = 16.62$ $P = .002$

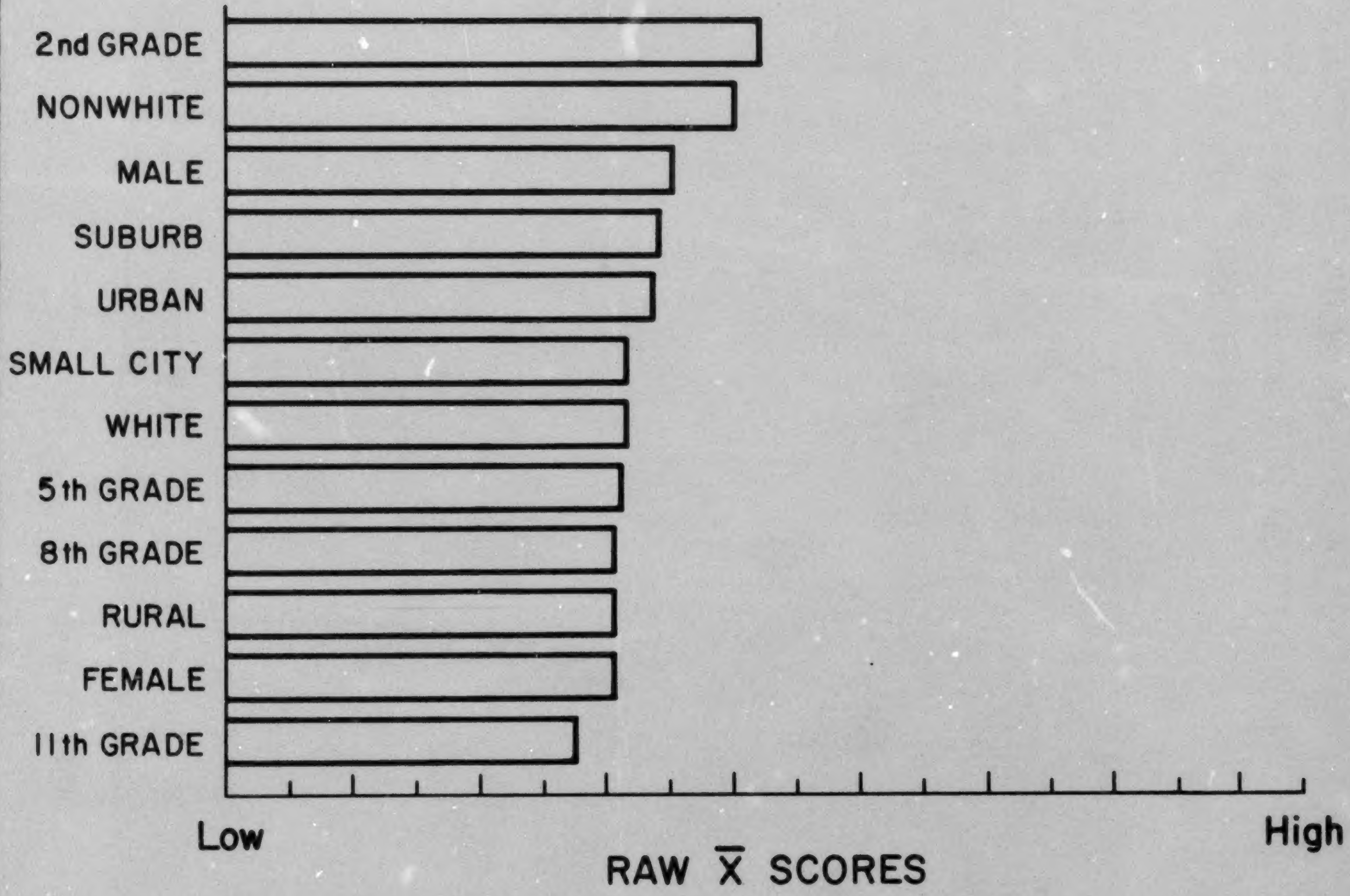
Table 40

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION RESULTS ON UTILITARIAN ATTITUDE SCALE AMONG AGE, SEX, ETHNIC AND URBAN/RURAL GROUPS

	SIG F	$\bar{X}$ SCORE	DEVIATION FROM GRAND MEAN AFTER ADJUSTING FOR INDEPENDENT AND COVARIATE VARIABLES
AGE	.00		
2ND GRADE		4.20	0.86
5TH GRADE		3.10	-0.16
8TH GRADE		3.06	-0.24
11TH GRADE		2.77	-0.43
SEX	.09		
MALE		3.50	0.19
FEMALE		3.06	-0.19
ETHNICITY	.01		
WHITE		3.13	-0.16
NONWHITE		4.02	0.78
URBAN/RURAL	.69		
URBAN		3.39	-0.12
SMALL CITY		3.15	0.20
SUBURB		3.44	0.03
RURAL		3.06	-0.04

Figure 18

UTILITARIAN SCALE MEAN SCORES BY CHILDREN DEMOGRAPHIC GROUPS



suggested by a number of specific question results. For example, on an energy development - wildlife protection question, a majority of second graders favored oil drilling despite its potential harm to wildlife, in contrast to 18% of 8th and 20% of 11th graders (Table 41). Regarding controlling foxes that prey on domestic livestock, 46% of 2nd graders approved of killing all foxes and 71% eliminating individual foxes responsible for the damage, in contrast to 3% and 38% of 11th graders approving of these predator control options (Table 42).

Ethnic differences were also statistically significant on the utilitarian scale with black children revealing a greater willingness to support the practical needs of humankind over the protection of animals. This difference was also evident in the national adult study and could not be explained by either urban/rural or socioeconomic distinctions among whites and nonwhites.

Male/female differences on the utilitarian scale were significant at only the .09 confidence level. Female children were somewhat less pragmatically and materially oriented to animals than male children. This tendency was also reflected in the finding that male children cited "useful animals" as their preferred type of animal twice as often as female children. Additionally, female students were generally more willing than male students to forego energy development projects to protect various rare and endangered animals.

ECOLOGISTIC ATTITUDE

Major differences occurred among varying children's groups on the ecologistic scale (Table 43 and Figure 16). Second graders had the lowest ecologistic scores of any demographic group, in particular contrast to 11th

Table 41

IF THEY FOUND OIL WHERE WILD ANIMALS LIVED, WE WOULD HAVE TO GET THE OIL, EVEN IF IT HARMED THE ANIMALS.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
2ND GRADE	23.8	27.0	14.3	20.6
5TH GRADE	1.5	25.0	38.2	19.1
8TH GRADE	0.0	17.9	37.3	13.4
11TH GRADE	0.0	20.3	46.4	7.2
ALL CHILDREN	6.0	22.5	34.5	15.0

$x^2 = 66.99$ $P = < .001$

Table 42

SOMETIMES FARMERS LOSE A LOT OF MONEY BECAUSE FOXES KILL THEIR CHICKENS. WHAT DO YOU THINK FARMERS SHOULD DO WITH THESE FOXES?

KILL ALL THE FOXES.

	STRONGLY APPROVE	APPROVE	DISAPPROVE	STRONGLY DISAPPROVE
2ND GRADE	33.3	12.7	9.5	36.5
5TH GRADE	2.9	4.4	52.9	33.8
8TH GRADE	1.5	6.0	71.6	17.9
11TH GRADE	0.0	2.9	55.1	34.8
ALL CHILDREN	9.0	6.4	47.9	30.7

$x^2 = 95.16$ P = < .001

ONLY GET RID OF THE FOXES THEY KNOW KILLED THEIR CHICKENS.

	STRONGLY APPROVE	APPROVE	DISAPPROVE	STRONGLY DISAPPROVE
2ND GRADE	52.4	19.0	11.1	4.8
5TH GRADE	5.9	44.1	29.4	5.9
8TH GRADE	3.0	38.8	40.3	6.0
11TH GRADE	1.4	36.2	44.9	5.8
ALL CHILDREN	15.0	34.8	31.8	5.6

$x^2 = 98.25$ P = < .001

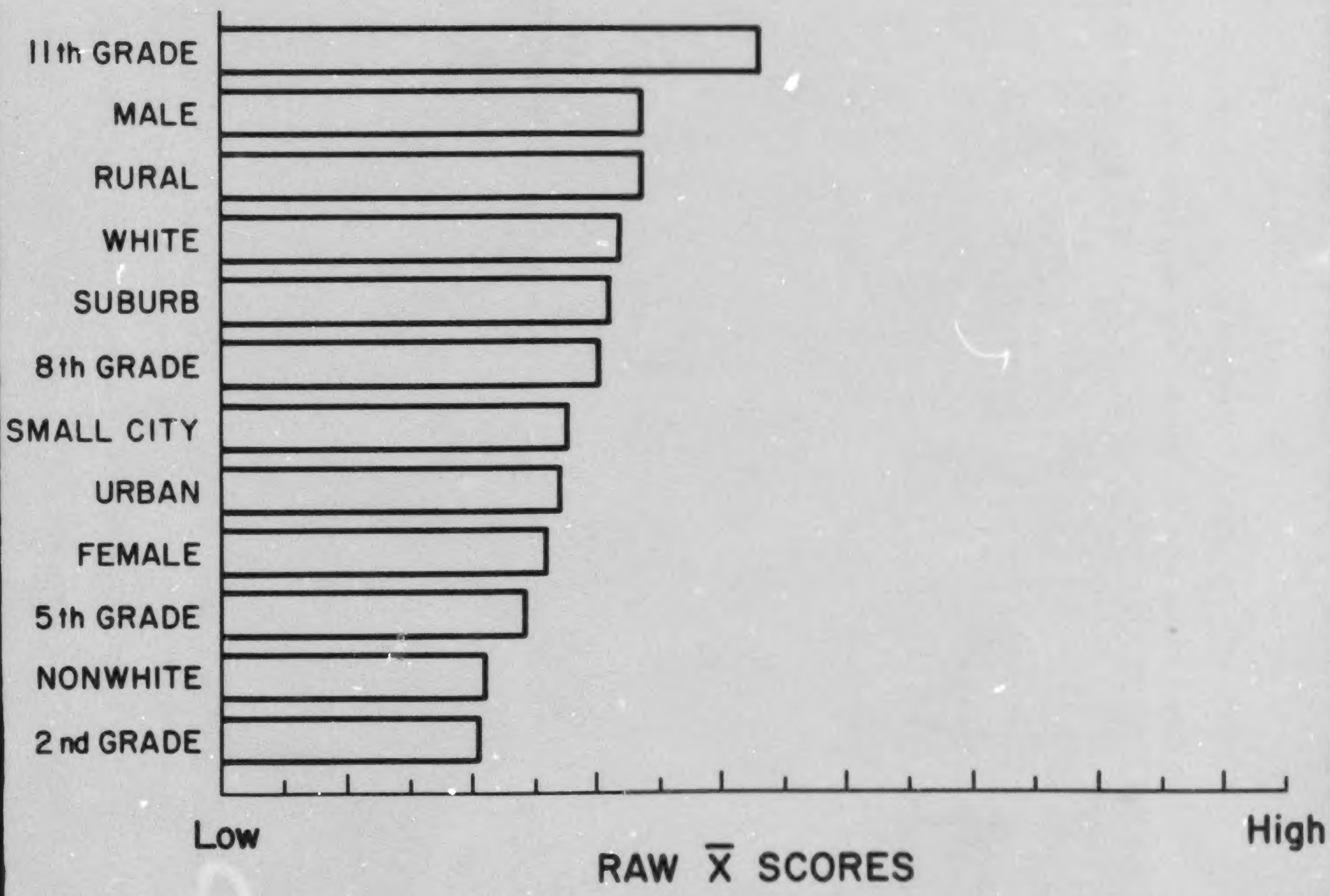
Table 43

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION RESULTS ON ECOLOGISTIC ATTITUDE SCALE AMONG AGE, SEX, ETHNIC AND URBAN/RURAL GROUPS

	SIG F	$\bar{X}$ SCORE	DEVIATION FROM GRAND MEAN AFTER ADJUSTING FOR INDEPENDENT AND COVARIATE VARIABLES
AGE	.00		
2ND GRADE		2.06	-1.06
5TH GRADE		2.43	-0.57
8TH GRADE		3.03	0.26
11TH GRADE		4.28	1.30
SEX	.01		
MALE		3.36	0.39
FEMALE		2.60	-0.38
ETHNICITY	.01		
WHITE		3.18	0.13
NONWHITE		2.12	-0.66
URBAN/RURAL	.38		
URBAN		2.71	-0.10
SMALL CITY		2.77	-0.53
SUBURB		3.11	0.42
RURAL		3.35	0.10

Figure 16

ECOLOGISTIC SCALE MEAN SCORES BY CHILDREN DEMOGRAPHIC GROUPS



grade children. Large differences were also observed among other age groups and, in general, higher ecologistic scale scores were found among older children, with the greatest difference occurring between 8th and 11th grades.

These ecologistic variations were especially apparent on the ecologistic film segment. In this film section, children were confronted with a number of situations involving animals feeding on one another, as well as activities contributing to the recycling of organic nutrients. In one segment depicting a snake swallowing a mouse, 62% of the 2nd graders regarded the snake as "bad" for killing the mouse compared to 15% of 11th graders (Table 44). At the completion of the ecologistic film segment, nearly 40% of 2nd graders, compared to 7% of children in the 8th and 11th grades, said it was "wrong" for animals to kill and eat one another (Table 45). Seventy-four percent of 2nd graders, in contrast to one-quarter of 11th grade children, also thought it would be better if animals ate only plants (Table 46). A majority of children in the 2nd and 8th grades additionally described dung beetles eating manure as "disgusting." Only 28% of 11th graders regarded dung beetles in this way, although even a majority of older children failed to recognize the ecological value of this activity.

Ethnic differences were very pronounced on the ecologistic scale. Nonwhites had the lowest ecologistic scores of any demographic group with the exception of 2nd graders.

Significant male/female differences were also observed on the ecologistic scale. Male children had relatively high ecologistic scores, second only to 11th graders. Urban/rural results, although not significant, consistently suggested a greater ecologistic attitude among suburban and rural than urban

Table 44

ECOLOGISTIC FILM SEGMENT BY AGE

IS THE SNAKE BAD FOR KILLING THE MOUSE?

	YES	NO
2ND GRADE	62.3	37.7
5TH GRADE	33.8	63.2
8TH GRADE	15.2	84.8
11TH GRADE	14.7	85.3
ALL CHILDREN	30.8	68.4

$X^2 = 50.66$ P = <.001

Table 45

IS IT WRONG FOR ANIMALS TO KILL AND EAT OTHER ANIMALS?

	YES	NO
2ND GRADE	39.3	60.7
5TH GRADE	34.3	59.7
8TH GRADE	6.1	92.4
11TH GRADE	8.8	91.2
ALL CHILDREN	21.8	76.3

$X^2 = 43.14$ P = <.001

Table 46

WOULD IT BE BETTER IF ANIMALS DIDN'T KILL OTHER ANIMALS AND ATE PLANTS INSTEAD?

	YES	NO
2ND GRADE	73.8	23.0
5TH GRADE	50.0	47.1
8TH GRADE	24.2	72.7
11TH GRADE	25.0	70.6
ALL CHILDREN	42.6	54.0

$X^2 = 44.49$ P = <.001

children.

SCIENTISTIC ATTITUDE

Scientistic attitude differences were generally not impressive (Figure 17 and Table 47). The most unusual finding was the rarity of this perspective among all children, although higher scientistic scores were curiously found among the youngest children. A closer examination of various scientistic attitude question results suggested this variation may have been largely due to greater support for laboratory animal experimentation among younger children.

DOMINIONISTIC ATTITUDE

Second graders had the highest dominionistic attitude scores of any demographic group (Figure 18). Younger children consistently revealed a greater willingness to subordinate animals for the enhancement of human enjoyment and sporting satisfactions. Fifth graders were also more dominionistically oriented, but to a far less extent than 2nd graders. Interestingly, 8th not 11th graders had the lowest dominionistic scale scores. The dominionistic tendencies of second graders were also reflected in 78% favoring dogs being strictly trained to obey every command, compared to less than 35% of the older children (Table 48); and, the youngest children were twice as likely to approve of beating horses or dogs as part of their training (Table 49). Finally, 61% of second graders enjoyed the dominionistic film segments compared to 30% of 8th and 11th grade children (Table 50).

Ethnic differences were significant with higher dominionistic scores occurring among nonwhite children, especially black males. This difference

Figure 17

SCIENTISTIC SCALE MEAN SCORES BY CHILDREN DEMOGRAPHIC GROUPS

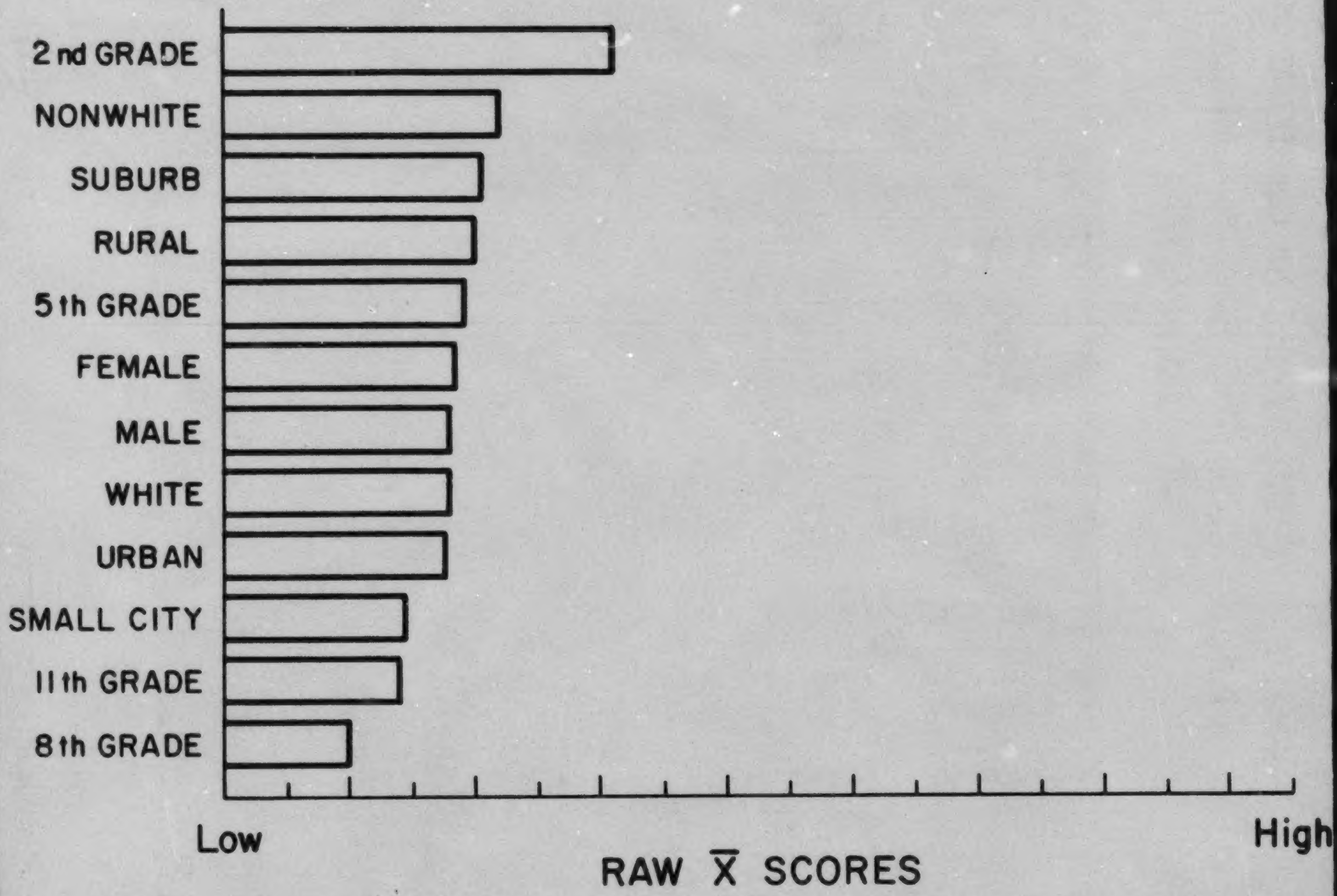


Table 47

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION RESULTS ON DOMINIONISTIC ATTITUDE SCALE AMONG AGE, SEX, ETHNIC AND URBAN/RURAL GROUPS

	SIG F	$\bar{X}$ SCORE	DEVIATION FROM GRAND MEAN AFTER ADJUSTING FOR INDEPENDENT AND COVARIATE VARIABLES
AGE	.00		
2ND GRADE		4.65	1.71
5TH GRADE		3.26	0.24
8TH GRADE		1.96	-1.35
11TH GRADE		2.12	-0.56
SEX	.00		
MALE		3.61	0.64
FEMALE		2.34	-0.62
ETHNICITY	.01		
WHITE		2.74	-0.25
NONWHITE		3.83	1.21
URBAN/RURAL	.24		
URBAN		3.04	-0.48
SMALL CITY		3.34	1.15
SUBURB		3.19	-0.12
RURAL		2.42	-0.15

Figure 18

DOMINIONISTIC SCALE MEAN SCORES BY CHILDREN DEMOGRAPHIC GROUPS

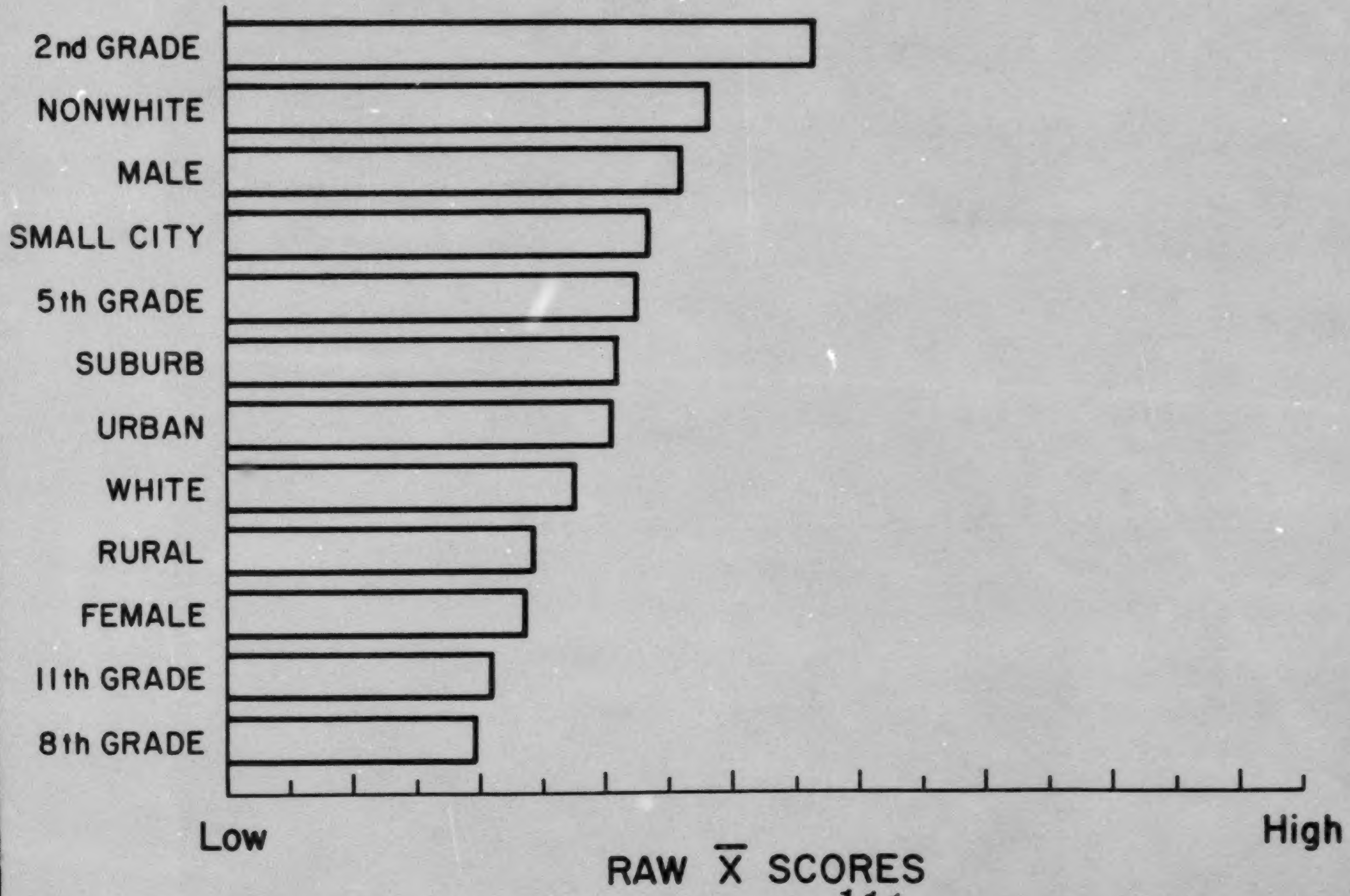


Table 48

ALL DOGS SHOULD BE VERY STRICTLY TRAINED SO THEY DO EVERYTHING THEIR OWNERS TELL THEM TO DO.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
2ND GRADE	44.4	33.3	7.9	11.1
5TH GRADE	10.3	32.4	36.8	5.9
8TH GRADE	1.5	19.4	56.7	16.4
11TH GRADE	1.4	21.7	56.5	14.5
ALL CHILDREN	13.9	26.6	40.1	12.0

$x^2 = 98.14$ $P = < .001$

Table 49

SOMETIMES PEOPLE MUST BEAT A HORSE OR DOG HARD TO MAKE IT DO WHAT THEY WANT.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
2ND GRADE	9.7	27.4	21.0	25.8
5TH GRADE	1.5	14.7	33.8	41.2
8TH GRADE	0.0	10.4	52.2	29.9
11TH GRADE	0.0	15.9	40.6	39.1
ALL CHILDREN	2.6	16.9	37.2	34.2

$x^2 = 38.87$ $P = < .001$

Table 50

DOMINIONISTIC FILM SEGMENT:

HOW MUCH DID YOU LIKE THIS PART OF THE FILM?

	LIKED A LOT	LIKED A LITTLE	DISLIKED A LOT	DISLIKED A LITTLE
2ND GRADE	60.8	29.4	7.8	2.0
5TH GRADE	51.6	35.9	9.4	3.1
8TH GRADE	25.4	46.0	17.5	11.1
11TH GRADE	35.0	45.0	13.3	6.7
ALL CHILDREN	42.4	39.5	12.2	5.9

$x^2 = 20.91$ $P = .013$

was also reflected in 74% of black compared to 34% of white children favoring the strict training of dogs to obey every command (Table 51).

Male children had significantly higher dominionistic attitude scores than female children. This difference also occurred in the national adult study.

Table 51

ALL DOGS SHOULD BE VERY STRICTLY TRAINED SO THEY DO EVERYTHING THEIR OWNERS TELL THEM TO DO.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
WHITE	12.1	22.2	43.0	14.0
NONWHITE	21.4	52.4	21.4	4.8

$x^2 = 24.05 \quad P = \leq .001$

CHAPTER VI

SUMMARY OF ATTITUDE AND KNOWLEDGE RESULTS AMONG MAJOR DEMOGRAPHIC GROUPS

The previous two chapters reviewed results for each of the attitude and knowledge scales. This section will summarize these findings, but in the context of major patterns occurring among various demographic groups.

Significant age differences were observed on every scale with the exception of the humanistic (Table 52). Younger children tended to stress the needs and benefits of people over animals, and expressed minimal concern for the rights of animals or the protection of their natural habitats. This difference was reflected in highly significant utilitarian, dominionistic, ecologistic and moralistic scale results. Younger children also revealed far less interest in animals, particularly wildlife, especially in comparison to 11th graders. This difference was reflected in highly significant negativistic and naturalistic results. Additionally, second graders were less knowledgeable and conceptually informed about animals and the natural environment, as suggested by striking knowledge and ecologistic scale results.

Highly significant gender variations occurred on the dominionistic, ecologistic, humanistic, negativistic and knowledge scales (Table 53). Moderately significant utilitarian scale results were also apparent. These results suggested male children possessed greater factual knowledge, awareness and concern for wildlife than female children. On the other hand, female children appeared to be less willing to support activities resulting in the subordination and dominance of animals, and expressed greater emotional affection for large, attractive, primarily domestic pet animals.

Ethnic variations were striking on all the scales with the exception of the moralistic and scientistic attitudes (Table 54). The most outstanding

Table 52

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION ANALYSIS RESULTS FOR GRADE BY ATTITUDE AND KNOWLEDGE SCALES

	SIG F	$\bar{X}$ SCORE	DEVIATION FROM GRAND MEAN AFTER ADJUSTING FOR INDEPENDENT & COVARIATE VARIABLES
DOMINIONISTIC	.00		
2ND GRADE		4.65	1.71
5TH GRADE		3.26	0.24
8TH GRADE		1.96	-1.35
11TH GRADE		2.12	-0.56
ECOLOGISTIC	.00		
2ND GRADE		2.06	-1.06
5TH GRADE		2.43	-0.57
8TH GRADE		3.03	0.26
11TH GRADE		4.28	1.30
HUMANISTIC	.67		
2ND GRADE		4.37	0.16
5TH GRADE		4.26	-0.02
8TH GRADE		4.03	-0.12
11TH GRADE		4.52	-0.03
MORALISTIC	.01		
2ND GRADE		3.59	-0.30
5TH GRADE		3.79	-0.12
8TH GRADE		3.45	-0.36
11TH GRADE		4.71	0.74
NATURALISTIC	.01		
2ND GRADE		5.89	0.03
5TH GRADE		5.53	-0.20
8TH GRADE		5.18	-0.83
11TH GRADE		6.84	0.97

Table 52 continued

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION ANALYSIS RESULTS FOR GRADE BY ATTITUDE AND KNOWLEDGE SCALES

	SIG F	$\bar{X}$ SCORE	DEVIATION FROM GRAND MEAN AFTER ADJUSTING FOR INDEPENDENT & COVARIATE VARIABLES
NEGATIVISTIC	.00		
2ND GRADE		8.79	2.87
5TH GRADE		6.29	0.12
8TH GRADE		5.12	-0.87
11TH GRADE		4.04	-1.98
SCIENTISTIC	.00		
2ND GRADE		3.11	1.22
5TH GRADE		1.93	0.17
8TH GRADE		1.06	-0.87
11TH GRADE		1.38	-0.48
UTILITARIAN	.00		
2ND GRADE		4.20	0.86
5TH GRADE		3.10	-0.16
8TH GRADE		3.06	-0.24
11TH GRADE		2.77	-0.43
KNOWLEDGE	.00		
2ND GRADE		30.50	-13.99
5TH GRADE		39.65	-5.64
8TH GRADE		51.18	7.45
11TH GRADE		55.11	11.57

Table 53

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION ANALYSIS RESULTS FOR SEX BY ATTITUDE AND KNOWLEDGE SCALES

	SIG F	$\bar{X}$ SCORE	DEVIATION FROM GRAND MEAN AFTER ADJUSTING FOR INDEPENDENT & COVARIATE VARIABLES
DOMINIONISTIC			
MALE	.00	3.61	0.64
FEMALE		2.34	-0.62
ECOLOGISTIC			
MALE	.01	3.36	0.39
FEMALE		2.60	-0.38
HUMANISTIC			
MALE	.01	3.93	-0.35
FEMALE		4.65	0.34
MORALISTIC			
MALE	.27	3.73	-0.16
FEMALE		4.05	0.16
NATURALISTIC			
MALE	.66	5.78	-0.13
FEMALE		5.95	0.13

Table 53 continued

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION ANALYSIS RESULTS FOR SEX BY ATTITUDE AND KNOWLEDGE SCALES

	SIG F	$\bar{X}$ SCORE	DEVIATION FROM GRAND MEAN AFTER ADJUSTING FOR INDEPENDENT & COVARIATE VARIABLES
NEGATIVISTIC			
MALE	.00	5.18	-0.88
FEMALE		6.80	0.85
SCIENTISTIC			
MALE	.89	1.83	-0.03
FEMALE		1.86	0.03
UTILITARIAN			
MALE	.09	3.50	0.19
FEMALE		3.06	-0.19
KNOWLEDGE			
MALE	.02	47.03	2.47
FEMALE		41.82	-2.39

Table 54

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION ANALYSIS RESULTS FOR ETHNICITY BY ATTITUDE AND KNOWLEDGE SCALES

	SIG F	$\bar{X}$ SCORE	DEVIATION FROM GRAND MEAN AFTER ADJUSTING FOR INDEPENDENT & COVARIATE VARIABLES
DOMINIONISTIC			
WHITE	.01	2.74	-0.25
NONWHITE		3.83	1.21
ECOLOGISTIC			
WHITE	.01	3.18	0.13
NONWHITE		2.12	-0.66
HUMANISTIC			
WHITE	.02	4.41	0.19
NONWHITE		3.50	-0.94
MORALISTIC			
WHITE	.39	3.91	0.03
NONWHITE		3.55	-0.14
NATURALISTIC			
WHITE	.07	6.01	0.05
NONWHITE		5.05	-0.22

Table 54 continued

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION ANALYSIS RESULTS FOR ETHNICITY BY ATTITUDE AND KNOWLEDGE SCALES

	Sig F	$\bar{X}$ Score	Deviation From Grand Mean After Adjusting For Independent & Covariate Variables
NEGATIVISTIC			
White	.00	5.58	-0.16
Nonwhite		7.60	0.79
SCIENTISTIC			
White	.18	1.80	-0.08
Nonwhite		2.19	0.39
UTILITARIAN			
White	.01	3.13	-0.16
Nonwhite		4.02	0.78
KNOWLEDGE			
White	.00	47.4	1.17
Nonwhite		3.16	-5.72

difference was the far greater knowledge of animals and the natural environment of white children. Black children also expressed a greater willingness to subordinate animals, especially in the context of improving human material well-being. These differences were reflected in significant dominionistic and utilitarian scale results. Additionally, black children revealed less affection for and general interest in animals, particularly wildlife, as suggested by significant humanistic, negativistic and naturalistic scale results.

Surprisingly few significant residential group differences occurred (Table 55). Significant urban/rural results were observed on only the negativistic and knowledge scales. These rosults suggested rural children were more interested in and knowledgeable about animals than children in other residential areas, particularly the large cities.

Table 55

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION ANALYSIS RESULTS FOR POPULATION PRESENT RESIDENCE BY ATTITUDE AND KNOWLEDGE SCALES

	Sig F	$\bar{X}$ Score	Deviation From Grand Mean After Adjusting For Independent & Covariate Variables
DOMINIONISTIC	.24		
Urban		3.04	-0.48
Small City		3.34	1.15
Suburb		3.19	-0.12
Rural		2.42	-0.15
ECOLOGISTIC	.38		
Urban		2.71	-0.10
Small City		2.77	-0.53
Suburb		3.11	0.42
Rural		3.35	0.10
HUMANISTIC	.84		
Urban		4.15	0.18
Small City		4.49	-0.01
Suburb		4.42	-0.04
Rural		4.30	-0.15
MORALISTIC	.43		
Urban		3.92	-0.08
Small City		4.23	0.30
Suburb		4.02	0.31
Rural		3.50	-0.40
NATURALISTIC	.16		
Urban		5.47	-0.49
Small City		5.72	-0.09
Suburb		5.79	-0.06
Rural		6.61	0.67

Table 55 continued

ANALYSIS OF VARIANCE AND MULTIPLE CLASSIFICATION ANALYSIS RESULTS FOR POPULATION PRESENT RESIDENCE BY ATTITUDE AND KNOWLEDGE SCALES

	SIG F	$\bar{X}$ SCORE	DEVIATION FROM GRAND MEAN AFTER ADJUSTING FOR INDEPENDENT & COVARIATE VARIABLES
NEGATIVISTIC	.04		
URBAN		6.75	0.61
SMALL CITY		5.85	0.41
SUBURB		6.29	-0.32
RURAL		4.91	-0.68
SCIENTISTIC	.23		
URBAN		1.78	0.33
SMALL CITY		1.45	-0.13
SUBURB		2.06	-0.05
RURAL		2.03	-0.15
UTILITARIAN	.69		
URBAN		3.39	-0.12
SMALL CITY		3.15	0.20
SUBURB		3.44	0.03
RURAL		3.06	-0.04
KNOWLEDGE	.00		
URBAN		38.00	-5.96
SMALL CITY		46.90	-1.13
SUBURB		42.90	2.52
RURAL		52.30	5.23

CHAPTER VII

ANIMAL-RELATED ACTIVITIES

This chapter will consider children's involvement in a variety of animal-related activities. The activities have been defined very broadly and roughly distinguished in four ways: extractive wildlife activities* (e.g., hunting, fishing, trapping); nonextractive wildlife activities (e.g., birdwatching); domestic animal activities (e.g., pets, livestock); and, what might be called, vicarious activities (e.g., watching wildlife-related television programs). The following presentation will review the frequency of these activities among all children as well as among various demographic groups. In addition, knowledge and attitude scale scores will be examined among children participating in various activities.

1. HUNTING

The reader should recognize that "hunting" was not defined by the interviewers and children may have possessed varying ideas about the meaning and definition of "hunting." The following results should, therefore, be examined with some caution.

Eighteen percent of the sample reported having hunted at some point in life, and 12% during the past two years (Table 56)**. This latter figure is high compared to Connecticut results on the 1980 National Fishing and Hunting

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* The word 'extractive' is used to connote the direct removal of wild animals from their natural habitats as an intregal part of the activity. The term is used in place of the more familiar, but potentially misleading term, 'consumptive' wildlife activities. The term 'nonextractive' wildlife activities is used to describe activities whose primary intent is not to remove the animal from the wild, although a secondary impact may be damage or harm to the animal or its habitat.

**Specific frequencies on animal-related questions are included in Appendix I.

TABLE 56

HUNTING AND ANTI-HUNTING BY TOTAL POPULATION

	PERCENT OF TOTAL POP. (N)	PERCENT OF HUNTERS (N)
EVER HUNTED	17.6%(47)	
TIMES WENT HUNTING		
1 - 2	7.5 (20)	43.5 (20)
3 - 10	4.9 (13)	28.3 (13)
11 OR MORE	4.9 (13)	28.3 (13)
HUNTED IN PAST 2 YEARS	11.6 (31)	67.4 (31)
NUMBER OF FRIENDS WHO HUNT		
0	42.9(111)	
1 - 2	28.6 (74)	
3 - 10	28.6 (74)	
HAVE A FAMILY MEMBER WHO HUNTS	41.7(110)	
WENT HUNTING WITH THAT FAMILY MEMBER	38.0 (41)	
OPPOSED TO SPORT HUNTING (ONLY 11TH GRADERS)	81.2 (56)	
REASON FOR OPPOSITION TO SPORT HUNTING (ONLY 11TH GRADERS)		
MORALLY WRONG	72.7 (40)	
PAIN INFLICTED	14.5 (8)	
LOVE ANIMALS	7.3 (4)	
OTHER	5.5 (3)	

Survey (59). According to the latter survey, only 1% of Connecticut residents aged 6 - 15 hunted in 1980. Our study results should be somewhat higher because they included children from a wider age range and children who hunted for a longer time period (2 years versus 1 year). The figures for the older children who hunted in our sample were comparable with those reported by the National Shooting Sports Foundation (NSSF, 1979), Pomerantz (1977) and La Hart (34) Twenty percent of the present eighth and eleventh grade population said they had hunted. The same 20% figure was reported by the NSSF in their survey of the nation's 12 through 17 year olds (seventh through twelfth graders, roughly); 28% of seventh through twelfth graders in Pomerantz's study of Michigan children also said they had hunted in the past year. La Hart found 27% of eighth grade students in Florida had hunted in the past year.

Substantially more males (28%) than females (7%) hunted, and fifth (34%) and eighth (49%) grade males were more likely to hunt than second (6%) and eleventh (24%) grade males (Table 57).

Over half (57%) of the children said they had a friend who hunted. Children from rural areas (78%), males (64%), and eleventh graders (75%) were the most likely to have friends who hunted. Forty-two percent reported a family member who hunts (Table 56). Rural children (44%) were most likely to have accompanied family members on hunting trips (Table 57).

Children who hunted at least once in their lives had much higher knowledge scores than those who did not (Table 58). (The knowledge and attitude scores of children who hunted, as well as children who participated in seven other animal-related activities are presented in Table 58). Pomerantz also reported a similar result, but La Hart found nonconsumptive users were more

TABLE 57

HUNTING BY DEMOGRAPHIC CHARACTERISTICS

AREA OF RESIDENCE	PERCENT OF						
	RURAL(N)	SUBURB(N)	SMALL CITY(N)	URBAN(N)	X^2	DF	P
HAVE A FAMILY MEMBER WHO HUNTS	54.4(36)	26.2(16)	48.8(22)	40.4(36)	11.04	3	.0111

SEX	PERCENT OF				
	MALE POP.(N)	FEMALE POP.(N)			
EVER HUNTED	28.2(37)	7.4(10)	20.81	2	.0000
NUMBER OF FRIENDS WHO HUNT					
0	35.9(46)	49.6(65)			
1 - 2	29.7(38)	27.5(36)			
3 OR MORE	34.4(44)	22.9(30)	5.92	2	.0518

GRADE LEVEL	PERCENT OF						
	2ND	5TH	8TH	11TH			
NUMBER OF FRIENDS WHO HUNT							
0	61.7(37)	51.6(33)	36.4(24)	24.6(17)			
1 - 2	21.7(13)	28.1(18)	33.3(22)	30.4(21)			
3 OR MORE	16.7(10)	20.3(13)	30.3(20)	44.9(31)	24.73	6	.004

Table 58

MEAN SCORES AND SIGNIFICANCE LEVELS OF SELECTED ANIMAL ACTIVITY GROUPS BY ATTITUDE AND KNOWLEDGE SCALES

ACTIVITY GROUP (N)	KNOW-LEDGE	DOMIN-IONISTIC	ECOLO-GISTIC	HUMAN-ISTIC	MORAL-ISTIC	NATURAL-ISTIC	NEGATIV-ISTIC	SCIEN-TISTIC	UTIL-ITARIAN
HAVE A PET									
YES	45.76	2.85	3.21	4.48	4.07	6.04	5.46	1.74	3.16
NO	40.00	3.34	2.20	3.72	3.33	5.30	7.75	2.19	3.63
	F=4.69	F=1.70	F=8.39	F=5.10	F=4.48	F=2.76	F=15.71	F=3.20	F=2.35
	P<.03	P<.19	P<.00	P<.02	P<.04	P<.10	P<.00	P<.07	P<.13
FAMILY RAISED LIVESTOCK									
YES	47.09	3.38	3.33	4.22	3.65	6.04	5.65	2.27	3.24
NO	43.89	2.88	2.90	4.33	3.98	5.84	6.05	1.75	3.28
	F=1.29	F=1.57	F=1.29	F=.10	F=.74	F=.17	F=.40	F=3.87	F=.02
	P<.26	P<.21	P<.26	P<.76	P<.39	P<.70	P<.53	P<.05	P<.90
EVER HUNTED									
YES	51.77	3.09	3.32	3.94	3.36	6.32	3.89	1.96	3.45
NO	42.89	2.95	2.91	4.36	4.00	5.78	6.43	1.83	3.23
	F=9.00	F=.01	F=1.08	F=1.23	F=2.62	F=1.13	F=15.39	F=.20	F=.40
	P<.00	P<.74	P<.00	P<.27	P<.11	P<.29	P<.00	P<.66	P<.53
EVER FISHED									
YES	45.63	2.96	3.06	4.29	3.84	5.80	5.75	1.82	3.31
NO	36.14	3.00	2.34	4.74	4.23	6.29	7.68	2.03	3.06
	F=8.03	F=.01	F=2.63	F=1.45	F=.73	F=.72	F=6.75	F=.43	F=.42
	P<.00	P<.94	P<.11	P<.23	P<.39	P<.40	P<.01	P<.51	P<.52
WENT OUTSIDE TO LOOK AT BIRDS									
YES	45.85	2.97	3.10	4.52	4.13	6.46	5.88	2.15	3.09
NO	42.32	2.96	2.78	3.98	3.57	5.03	6.18	1.41	3.53
	F=2.33	F=.00	F=1.09	F=3.39	F=3.36	F=14.11	F=.33	F=11.97	F=2.86
	P<.13	P<.95	P<.30	P<.07	P<.07	P<.00	P<.57	P<.00	P<.09
WENT TO A ZOO									
YES	44.89	2.88	3.00	4.28	3.96	5.88	5.94	1.74	3.27
NO	37.39	4.17	2.61	4.50	3.00	5.67	7.00	3.33	3.39
	F=2.72	F=3.98	F=.41	F=.14	F=2.54	F=.08	F=1.11	F=14.53	F=.06
	P<.10	P<.05	P<.52	P<.70	P<.11	P<.78	P<.29	P<.00	P<.81
BELONG TO ANIMAL CLUB									
YES	51.23	2.73	3.95	4.23	3.91	7.00	5.18	2.27	3.50
NO	43.77	2.99	2.88	4.30	3.89	5.76	6.08	1.81	3.25
	F=3.24	F=.19	F=3.87	F=.02	F=.00	F=3.14	F=.95	F=1.41	F=.28
	P<.07	P<.66	P<.05	P<.89	P<.99	P<.08	P<.33	P<.24	P<.60
LEARNED ABOUT ANIMALS IN SCHOOL IN PAST 2 YEARS									
YES	44.99	2.92	3.03	4.38	3.86	6.07	5.92	1.98	3.29
NO	43.64	3.07	2.95	4.09	4.20	5.02	6.20	1.24	2.87
	F=.19	F=.11	F=.03	F=.58	F=.71	F=4.20	F=.18	F=6.57	F=1.61
	P<.66	P<.74	P<.86	P<.45	P<.40	P<.04	P<.68	P<.01	P<.21

knowledgeable. Hunters also scored much lower on the negativistic attitude scale than non-hunters.

ANTI-HUNTING

Eighty-one percent of eleventh graders said they were opposed to hunting for sport (Table 56). Only the eleventh grade sample was asked this specific question. Seventh-three percent said they regarded hunting as morally wrong.

As reported in Chapter V, all four grade levels were asked if they approved or disapproved of different reasons for hunting. Most disapproved of hunting for "fun" or hunting "wild animals in Africa and putting their horns on the wall," and most approved of hunting for food. Second graders, however, expressed far more approval of the two sport forms of hunting than did the older children. Second and fifth graders approved most of hunting for food.

In the National Shooting Sports Foundation's survey of attitudes toward hunting among 12 to 17 year-olds, less than 25% of the boys and a much higher percentage of girls were against hunting. Pomerantz (51) and Shaw (56) also reported young females outnumber males in anti-hunting sentiment. In contrast, the majority of females (89%) and males (73%) were opposed to sport hunting in the present study and no significant differences were found on the basis of race, sex or area of residence. Significantly more males approved of hunting for food than did females.

TRAPPING

Like hunting, the following results should be examined with caution. Some children may have regarded trapping as an activity that included live-trapping of frogs, squirrels, rabbits, or snakes with cardboard boxes or jars, and setting traps for small rodents in the house.

Thirteen percent of the total sample said they had "trapped" an animal at some time in life and most of these chidren were male (Table 59). Twenty-six percent of the sample had a friend who traps and these were mostly males and children from rural areas. A majority (83%) did not have a family member who traps. Of those who did, significantly more were black (31%) than white children (13%), and from rural areas (28% of the rural sample).

FISHING

Fishing was the third most frequently reported activity. Eighty-seven percent of the children said they had fished at some point in their life and 85% fished in the past two years (Table 60). Fishing was also the most popular wildlife-oriented activity in Pomerantz's study of 12 - 18 year olds and 78% of La Hart's 13 - 14 year old sample went fishing the previous year. The 1980 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation reported fishing among only 30% of 6 - 15 year olds in Connecticut.

White males and rural children were significantly more likely to have gone fishing. Of the four grade levels, eleventh graders were least likely to have fished in the past two years, and the decline in fishing activity from eighth to eleventh grade was quite pronounced. Pomerantz reported a similar difference in fishing among seventh and twelfth graders.

Children who fished had significantly higher knowledge scores and significantly lower negativistic scale scores than those who did not fish (Table 58).

TABLE 59

TRAPPING BY TOTAL POPULATION AND SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

	PERCENT OF TOTAL POPULATION (N)
EVER TRAPPED	12.8 (34)
NUMBER OF FRIENDS WHO TRAP	
0	74.2 (18)
1 - 2	16.0 (39)
3 OR MORE	9.8 (24)
HAVE A FAMILY MEMBER WHO TRAPS	16.6 (44)

SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

RACE	PERCENT OF TOTAL				
	WHITE POP. (N)	NONWHITE POP. (N)	X^2	DF	P
HAVE A FAMILY MEMBER WHO TRAPS	13.2(27)	31.0(13)	8.12	1	.0044

AREA OF RESIDENCE	PERCENT OF TOTAL						
	RURAL(N)	SUBURB(N)	SMALL CITY(N)	URBAN(N)			
NUMBER OF FRIENDS WHO TRAP							
0	52.5(32)	86.8(46)	80.0(36)	78.6(66)			
1 - 2	26.6(16)	9.4(5)	17.8(8)	11.9(10)			
3 OR MORE	21.3(13)	3.8(2)	2.2(1)	9.5(8)	24.57	6	.0004
HAVE A FAMILY MEMBER WHO TRAPS	27.7(18)	4.9(3)	14.9(7)	17.6(16)	11.91	3	.0077

SEX	PERCENT OF TOTAL				
	MALE (N)	FEMALE (N)			
EVER TRAPPED	20.6(27)	5.2(7)	14.19	1	.0002
NUMBER OF FRIENDS WHO TRAP					
0	65.3(79)	82.9(102)	9.91	2	.0071
1 - 2	21.5(26)	10.6(13)			
3 OR MORE	13.2(16)	8.5(8)			

TABLE 60

FISHING BY TOTAL POPULATION AND SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

	PERCENT OF TOTAL POPULATION (N)
EVER FISHED	86.9(232)
FISHED IN PAST 2 YEARS	86.0(203)
DAYS WENT FISHING IN PAST 2 YEARS	
1 - 2 DAYS	24.1 (49)
3 - 10 DAYS	36.5 (74)
11 OR MORE DAYS	39.4 (80)

SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

RACE	PERCENT OF TOTAL				
	WHITE (N)	NONWHITE (N)	X^2	DF	P
EVER FISHED	90.8(188)	76.2 (12)	7.26	1	.0070
DAYS WENT FISHING IN PAST 2 YEARS					
1 - 2 DAYS	21.1 (35)	42.9 (12)			
3 - 10 DAYS	34.9 (58)	39.3 (11)			
11 OR MORE DAYS	44.0 (73)	17.9 (5)	8.88	2	.0118

AREA OF RESIDENCE	PERCENT OF TOTAL						
	RURAL(N)	SUBURB(N)	SMALL CITY(N)	URBAN(N)			
FISHED	90.9(60)	95.1(59)	95.7(45)	73.6(67)	21.88	3	.0001
IN PAST 2 YEARS							
1 - 2 DAYS	14.8 (8)	23.5(12)	22.5 (9)	35.1(20)			
3 - 10 DAYS	25.9(14)	39.2(20)	42.5(17)	38.6(22)			
11 OR MORE DAYS	59.3(32)	37.3(19)	35.0(14)	26.3(15)	15.13	6	.0193

SEX	PERCENT OF TOTAL				
	MALE (N)	FEMALE (N)			
EVER FISHED	94.7(124)	79.4(108)	13.61	1	.0002
FISHED IN PAST 2 YEARS	94.4(118)	76.6 (85)	15.53	1	.0001

GRADE LEVEL	PERCENT OF TOTAL						
	2ND(N)	5TH(N)	8TH(N)	11TH(N)			
FISHED IN PAST 2 YEARS	86.8(46)	91.7(55)	93.4(57)	72.6(45)	13.72	3	.0033

BIRDWATCHING

Fifty-eight percent of the total sample said they had "gone outside just to look at birds" (Table 61). Even though the wording of this question was purposefully designed to avoid potential difficulty with the word "birdwatching," the 58% who responded positively is probably an overestimate of the number of children who actually "birdwatch."

Among grade levels, fifth graders participated in this activity the most. This supports the finding of the 1980 National Wildlife Recreation survey that 9 - 11 year old residents took the most interest, of all children and adult age groups, in observing wildlife around the home. Males and eighth graders were least likely to report participation in this activity.

Eighty-two percent of the total sample said their families fed birds (Table 61). A significantly greater number of white (85%) than black children (71%) fed birds.

There was no difference in knowledge of animals between those who did and those who did not go outside just to look at birds. Significantly higher naturalistic and scientistic attitude scores were found among "birdwatchers" (Table 58).

ZOO VISITATION

Visiting a zoo was the most frequently reported animal-related activity with 93% of the children having visited a zoo at least once in their life (Table 62). In comparison, 46% of the adults in the national survey said they visited a zoo in the past two years, and only 66% of seventh through twelfth graders in Pomerantz's study of Michigan children said they went to a zoo within the past year. Second graders (78%) were less likely than fifth

TABLE 61

BIRDWATCHING AND FEEDING BIRDS BY TOTAL POPULATION AND SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

	PERCENT OF TOTAL POPULATION (N)
WENT OUTSIDE TO LOOK AT BIRDS	58.4(156)
FAMILY FEEDS BIRDS	82.3(219)

SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

RACE	PERCENT OF TOTAL				
	WHITE (N)	NONWHITE (N)	X^2	DF	P
FAMILY FEEDS BIRDS	84.5(174)	71.4 (30)	4.06	1	.0438

SEX	PERCENT OF TOTAL				
	MALE (N)	FEMALE (N)			
WENT OUTSIDE TO LOOK AT BIRDS	48.1 (63)	68.4 (93)	11.31	1	.0008

GRADE LEVEL	PERCENT OF TOTAL						
	2ND(N)	5TH(N)	8TH(N)	11TH(N)			
WENT OUTSIDE TO LOOK AT BIRDS	61.9(39)	66.2(45)	43.3(29)	62.3(43)	8.76	3	.0328

TABLE 62

ZOO VISITATION BY TOTAL POPULATION AND SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

	PERCENT OF TOTAL POPULATION (N)
WENT TO A ZOO	93.3(249)
TIMES WENT TO A ZOO	
1 - 2 DAYS	33.3 (83)
3 - 10 DAYS	45.9(112)
11 OR MORE DAYS	21.7 (54)

SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

AREA OF RESIDENCE	PERCENT OF TOTAL				X^2	DF	P
	RURAL(N)	SUBURB(N)	SMALL CITY(N)	URBAN(N)			
TIMES WENT TO A ZOO							
1 - 2 DAYS	45.6(26)	45.8(27)	26.7(12)	19.5(17)			
3 - 10 DAYS	47.4(27)	45.8(27)	33.3(15)	49.4(43)			
11 OR MORE DAYS	7.0 (4)	8.5 (5)	40.0(18)	31.0(27)	35.56	6	.0000

GRADE LEVEL	PERCENT OF TOTAL						
	2ND(N)	5TH(N)	8TH(N)	11TH(N)			
WENT TO A ZOO	77.8(49)	97.1(66)	100.0(67)	97.1(67)	32.04	3	.0000
TIMES WENT TO ZOO							
1 - 2 DAYS	49.0(24)	24.2(16)	29.9(20)	34.3(23)			
3 - 10 DAYS	46.9(23)	45.5(30)	44.8(30)	43.3(29)			
11 OR MORE DAYS	4.1	39.3(20)	25.4(17)	22.4(15)	15.28	6	.0182

TABLE 63

MEMBERSHIP IN ANIMAL CLUB

	PERCENT OF TOTAL POPULATION (N)
MEMBER IN AN ANIMAL CLUB	8.2(22)

(97%), eighth (100%), or eleventh (97%) graders to have visited a zoo.

Most (78%) of the children who had been to a zoo did so on an infrequent basis (less than 11 times). Frequent zoo visitors were more likely to reside in the more urban areas. Thirty-one percent of urban, 40% of small city, 9% of suburban and only 7% of rural children visited a zoo on a frequent basis. Second graders were the least likely to visit a zoo frequently.

Zoo visitors and non-visitors were not significantly different on the knowledge of animals scale. Zoo visitors did have significantly lower dominionistic and scientistic scale scores (Table 58).

MEMBERSHIP IN ANIMAL-RELATED CLUBS

Membership in an animal-related club was the least frequently reported activity. Only 8% of the children said they belonged to this kind of club (Table 63).

Children who belonged to an animal club had among the highest knowledge, ecologistic, naturalistic, utilitarian and among the lowest dominionistic scale scores of all activity groups.

READING ANIMAL-RELATED BOOKS OR MAGAZINES

76% of the children read at least one book or magazine about animals in the past year (Table 64). In contrast, only 39% of the adults in the national survey said they read a book about animals in the past two years. Children living in urban areas were least likely and fifth graders were most likely to read books about animals (Table 65). 62% read a book about wild animals and 50% a book about pets. The percent of eighth and eleventh graders who read a book about wildlife (61%) was very close to the 58% figure

TABLE 64

READING ANIMAL-RELATED BOOKS BY TOTAL POPULATION

	PERCENT OF TOTAL POPULATION(N)
READ BOOK(S) ABOUT PETS IN PAST YEAR	50.0(133)
NUMBER OF PET BOOKS READ IN PAST YEAR	
1 - 3	66.2 (88)
4 - 10	21.8 (29)
11 OR MORE	12.0 (16)
READ BOOK(S) ABOUT WILD ANIMALS IN PAST YEAR	61.7(164)
NUMBER OF WILD ANIMAL BOOKS READ IN PAST YEAR	
1 - 3	59.1 (97)
4 - 10	25.0 (41)
11 OR MORE	15.9 (26)
KIND OF BOOK(S) LIKE TO READ MOST:	
ADVENTURE	44.4 (59)
WILD ANIMALS	36.1 (48)
PETS	29.3 (39)
SPACE	15.8 (21)
FAMOUS PEOPLE	11.3 (15)
EARTH, OCEAN, OR OUTDOORS	9.0 (12)

TABLE 65

READING ANIMAL-RELATED BOOKS

BY SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

AREA OF RESIDENCE	PERCENT OF TOTAL						
	RURAL(N)	SUBURB(N)	SMALL CITY(N)	URBAN(N)	X^2	DF	P
READ A BOOK ABOUT ANIMALS IN PAST 2 YEARS	77.3(51)	83.9(52)	80.9(38)	65.6(59)	7.99	3	.0461

GRADE LEVEL	PERCENT OF TOTAL						
	2ND(N)	5TH(N)	8TH(N)	11TH(N)			
READ A BOOK ABOUT ANIMALS IN PAST 2 YEARS	68.3(43)	88.1(49)	74.6(50)	71.0(49)	8.29	3	.0403
KIND OF BOOK(S) LIKE TO READ MOST:							
ADVENTURE	14.8 (9)	28.4(19)	47.0(31)				
WILD ANIMALS	23.0(14)	32.8(22)	18.2(12)				
PETS	41.0(25)	13.4 (9)	7.6 (5)				
SPACE	16.4(10)	11.9 (8)	4.5 (3)				
FAMOUS PEOPLE	0	10.4 (7)	12.1 (8)				
EARTH, OCEAN, OR OUTDOORS	4.9 (3)	3.0 (2)	10.6 (7)				

reported by Pomerantz for seventh through twelfth grade students. Seventh-three percent of La Hart's eighth grade sample reported reading books on this topic.

Second, fifth and eighth graders were asked a separate question about the types of books they enjoyed reading most -- books about the earth, ocean, or outdoors; space; adventure; famous people; pets; or wild animals. When the three grade levels were examined, second graders liked books about pets the most, fifth graders preferred books about wild animals, and eighth graders most often chose adventure books.

WATCHING ANIMAL-RELATED TV SHOWS

Eleventh graders were asked how often they watched the following animal-related television shows: Wild Kingdom; National Geographic Specials on Animals; Jacques Cousteau; In Search of; Animals Animals Animals; Nova Specials on Animals; American Sportsman; Last of the Wild; Wild Wild World of Animals; and Wide World of Adventure. The three most popular were Wild Kingdom -- viewed often by 28%; National Geographic Specials on Animals, by 24%; and Jacques Cousteau, by 21% (Table 66). Least popular were Wide World of Adventure, viewed rarely or ever by 84%; Nova Specials on Animals, by 79%; and Wild Wild World of Animals and Last of the Wild by approximately 70%. The animal-related television habits of eleventh graders were remarkably similar to those of adults interviewed in the national survey.

LEARNING ABOUT ANIMALS IN SCHOOL

This was the fourth most frequent activity with 83% of the children reporting they had learned about animals in school within the past two years

TABLE 66

WATCHING ANIMAL-RELATED TV PROGRAMS BY ELEVENTH GRADE POPULATION

	PERCENT OF TOTAL 11TH GRADE(N)		
	OFTEN	SOMETIMES	RARELY/NEVER
FREQUENCY OF VIEWING:			
WILD KINGDOM	27.9(19)	45.6(31)	26.5(18)
NATIONAL GEOGRAPHIC SPECIALS ON ANIMALS	23.9(16)	35.8(24)	40.3(27)
JACQUES COUSTEAU	21.2(14)	56.0(37)	22.8(15)
IN SEARCH OF	12.3 (8)	26.2(17)	61.5(40)
ANIMALS ANIMALS ANIMALS	9.1 (6)	34.9(23)	56.0(37)
NOVA SPECIALS ON ANIMALS	7.4 (5)	13.3 (9)	79.4(54)
AMERICAN SPORTSMAN	5.9 (4)	30.9(21)	63.2(43)
LAST OF THE WILD	3.0 (2)	26.9(18)	70.2(47)
WILD WILD WORLD OF ANIMALS	2.9 (2)	26.5(18)	70.5(48)
WIDE WORLD OF ADVENTURE	2.9 (2)	23.5(16)	83.5(50)

(Table 67). An almost equal percentage of second (90%) and fifth graders (89%) learned about animals in school, as did an almost equal percentage of eighth (76%) and eleventh graders (77%). The decline in this activity between the fifth and eighth grades was significant.

Most children reported learning about animals by looking at pictures (94%), reading (85%) and watching movies (85%). Conducting animal-related experiments was reported by 58% and going on trips to see animals by 46% of the children. Almost half (48%) said their teachers kept live animals in the classroom within the past two years.

Children from urban areas were least likely to have participated in most of these educational activities. Older children were more likely than younger children to have conducted experiments, but they were less likely to have gone on trips and to have had animals in the classrooms.

Surprisingly, no significant difference was found in the knowledge scores of children who did and did not learn about animals in school. Children who learned about animals in school scored significantly higher on the naturalistic and scientistic attitude scales (Table 58).

DAMAGE INFLICTED BY ANIMALS

Twelve percent of the children said they had received a dog bite which required medical attention (Table 68). Nine percent indicated being hurt by a wild animal to a serious extent. Nearly all (91%) incidents involving wild animals were bites from bees or wasps.

AQUARIUM AND NATURAL HISTORY MUSEUM VISITATION

Going to an aquarium at least once in the past two years was reported by

TABLE 67

LEARNING ABOUT ANIMALS IN SCHOOL BY TOTAL POPULATION AND SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

	PERCENT OF TOTAL POPULATION (N)
LEARNED ABOUT ANIMALS IN SCHOOL IN PAST 2 YEARS	82.8(216)
WAYS LEARNED ABOUT ANIMALS	86.0(203)
LOOKED AT PICTURES	93.5(186)
WATCHED MOVIES	85.3(163)
READ ABOUT THEM	85.3(163)
DID EXPERIMENTS	57.6 (98)
WENT ON TRIPS	45.6 (62)
TEACHERS KEPT LIVE ANIMALS IN CLASSROOM IN PAST 2 YEARS	47.7(125)

SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

RACE	PERCENT OF TOTAL				
	WHITE POP. (N)	NONWHITE POP. (N)	X^2	DF	P
WAYS LEARNED ABOUT ANIMALS					
READ ABOUT THEM	88.7(126)	71.4 (25)	6.71	1	.0096
WATCHED MOVIES	88.0(125)	74.3 (26)	4.23	1	.0397
DID EXPERIMENTS	63.7 (79)	39.4 (13)	6.35	1	.0117

AREA OF RESIDENCE	PERCENT OF TOTAL						
	RURAL(N)	SUBURB(N)	SMALL CITY(N)	URBAN(N)			
WAYS LEARNED ABOUT ANIMALS							
READ ABOUT THEM	77.6(38)	91.7(33)	100.0(37)	77.5(55)	15.98	3	.0011
WATCHED MOVIES	85.4(41)	100.0(34)	92.1(35)	74.6(53)	13.72	3	.0033
DID EXPERIMENTS	57.1(28)	83.3(15)	70.6(24)	44.9(31)	11.77	3	.0082
WENT ON TRIP	53.1(17)	57.9(11)	88.2(15)	27.9(19)	22.89	3	.0000
TEACHERS KEPT LIVE ANIMALS IN CLASSROOM IN PAST 2 YEARS	44.8(24)	70.5(43)	59.6(28)	28.9(26)	28.39	3	.0000

TABLE 67 CONTINUED

LEARNING ABOUT ANIMALS IN SCHOOL BY TOTAL POPULATION AND SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

GRADE LEVEL	PERCENT OF TOTAL						
	2ND(N)	5TH(N)	8TH(N)	11TH(N)			
LEARNED ABOUT ANIMALS IN SCHOOL IN PAST 2 YEARS	90.0(54)	89.4(59	75.8(50)	76.8(53)	8.22	3	.0417
WAYS LEARNED ABOUT ANIMALS							
READ ABOUT THEM	68.2(30)	89.6(43)	89.1(41)	92.5(49)	13.72	3	.0033
DID EXPERIMENTS	12.5 (4)	42.9(18)	68.2(30)	88.5(46)	52.70	3	.0000
WENT ON TRIPS	63.2(24)	64.9(24)	33.3 (9)	14.7 (5)	24.98	3	.0000
TEACHERS KEPT LIVE ANIMALS IN CLASSROOM IN PAST 2 YEARS	52.4(33)	66.7(44)	47.8(32)	24.2(16)	24.63	3	.0000

Table 68

DAMAGE BY ANIMALS AND COLLECTING INSECTS OR ANIMAL SIGNS BY TOTAL POPULATION AND SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

TOTAL POPULATION	PERCENT OF TOTAL POPULATION(N)
WENT TO SEE A DOCTOR BECAUSE OF DOG BITE	12.1 (32)
WENT TO SEE A DOCTOR BECAUSE HURT BY WILD ANIMAL	8.7 (23)
KIND OF WILD ANIMAL	
BEE, WASP	91.3 (21)
OTHER	8.6 (2)
WILD ANIMALS DAMAGED FAMILY'S GARDEN	34.4 (90)
COLLECT INSECTS OR ANIMAL SIGNS	50.4 (134)

SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

RACE	PERCENT OF TOTAL				
	WHITE POPULATION(N)	NONWHITE POPULATION(N)	X^2	DF	P
WILD ANIMALS DAMAGED FAMILY'S GARDEN	42.4 (86)	4.9 (2)	20.79	1	.0000

AREA OF RESIDENCE	PERCENT OF TOTAL						
	RURAL(N)	SUBURB(N)	SMALL CITY(N)	URBAN(N)			
WILD ANIMALS DAMAGED FAMILY'S GARDEN	63.1 (41)	36.7 (22)	31.9 (15)	12.4 (11)	43.28	3	.0000

67% of the children (Table 69). In contrast, only 27% of the adults in the national survey participated in this activity.

Natural history museum attendance was somewhat less common. For the previous two-year period, 53% visited a museum at least once. Only 33% of the adults in the national survey reported visiting a natural history museum.

CAMPING

Camping in the past two years was reported by 53% of the children (Table 69). Fourty-four percent went camping once or twice, 37% three to ten times, and 19% camped more than 10 times.

WILDLIFE PETS

Several investigators have reported a large and increasing demand for wildlife pets in the United States. For example, according to Duplaix (14), over 3,000,000 live mammals and reptiles were imported into this country in 1978, and 15,000,000 tropical fish are imported every year. Nilsson (50) estimates that the worldwide trade in wild birds is approximately 5,000,000 animals per year and perhaps 1,000,000 - 2,000,000 are imported into this country.

Information is scarce on the characteristics of the public creating this demand for wildlife. The results of the present study and and the national survey of adults, as well as findings of Pomerantz (51) and La Hart (35), suggest wildlife pet ownership is a popular phenomenon among a relatively young segment of the public. Twenty-nine percent of second, fifth, eighth and eleventh grade children said they had owned a wild animal (other than a bird) as a pet (Table 70). Similarly, Pomerantz reported 23% of seventh

Table 69

AQUARIUM AND MUSEUM VISITATION AND CAMPING BY TOTAL POPULATION

	PERCENT OF TOTAL POPULATION(N)
WENT TO AQUARIUM IN PAST 2 YEARS	67.0 (179)
TIMES WENT TO AQUARIUM IN PAST 2 YEARS	
1 - 2 DAYS	79.3 (142)
3 - 10 DAYS	20.1 (36)
11 OR MORE DAYS	.6 (1)
WENT TO MUSEUM IN PAST 2 YEARS	52.8 (141)
TIMES WENT TO MUSEUM IN PAST 2 YEARS	
1 - 2 DAYS	79.4 (112)
3 - 10 DAYS	17.0 (24)
11 OR MORE DAYS	3.5 (5)
WENT CAMPING OVERNIGHT IN PAST 2 YEARS	53.2 (142)
TIMES WENT CAMPING OVERNIGHT IN PAST 2 YEARS	
1 - 2 DAYS	43.7 (62)
3 - 10 DAYS	37.3 (53)
11 OR MORE DAYS	19.0 (27)

Table 70

WILDLIFE PET OWNERSHIP

BY TOTAL POPULATION AND SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

TOTAL POPULATION	PERCENT OF TOTAL POPULATION (N)	PERCENT OF WILDLIFE PET OWNERS (N)
EVER HAD WILD ANIMAL AS A PET (OTHER THAN A BIRD OR FISH)?	28.5 (75)	
KIND OF WILD ANIMAL?		
REPTILE/ AMPHIBIAN	7.5 (20)	26.3 (20)
RABBIT	6.7 (18)	23.7 (18)
RACOON	2.6 (7)	9.2 (7)
OTHER	11.6 (31)	40.8 (31)

SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS	PERCENT OF TOTAL				
RACE	WHITE POP. (N)	NONWHITE POP (N)	X2	DF	P
EVER HAD WILD ANIMAL AS A PET?	35.3 (72)	19.0 (8)	4.19	1	.0407

through twelfth grade children, and 34% of eighth graders interviewed by La Hart, owned a wild pet within the previous year. Thirteen percent of adults in the national adult study reported owning a wild pet (other than a bird) in the past ten years.

Among children, reptiles and amphibians were the most frequently owned wild animal (owned by 26%), rabbits were second (24%), and raccoons third (9%) (Table 70). The largest category was "other" (41%) which suggsts that a wide variety of wild animals are popular as pets among young people.

Thirty-three percent of all children said they had a pet bird at some time in their life (Table 71). Canaries and parakeets were the most frequently owned, with 61% of children with pet birds indicating they had owned these kind of birds. Parrots, mynas and cockatoos were second most frequent, owned by 16% of pet bird owners, and songbirds by 15%.

It is interesting to note the difference between the number of children and the number of adults in the national survey who said they had owned a parrott, myna or cockatoo. Twenty-two percent of second and fifth grade pet birdowners said they owned these birds compared to just 6% of adult pet birdowners. Moreover, only 5% of eighth and 11th graders reported owning a parrott, myna or cockatoo. These results suggest a trend toward exotic pet ownership among families with younger children.

A significantly greater number of children who lived in small cities and urban areas (39% and 42%) owned pet birds than those living in rural areas and the suburbs (24% and 25%).

DOMESTIC ANIMAL PETS

Having a domestic pet (other than a bird or horse) within the past year

Table 71

PET BIRD OWNERSHIP BY TOTAL POPULATION AND SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

TOTAL POPULATION	PERCENT OF TOTAL POPULATION (N)	PERCENT OF PET BIRDOWNERS (N)
EVER HAD PET BIRD?	33.2 (88)	
KIND OF PET BIRD.		
CANARY/PARAKEET	16.9 (45)	60.8 (45)
PARROT/MYNA/ COCKATOO	4.5 (12)	16.2 (12)
SONGBIRD	4.1 (11)	14.9 (11)
OTHER	2.2 (6)	8.1 (6)

SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS	PERCENT OF TOTAL (N)						
AREA OF RESIDENCE	RURAL	SUBURB	SMALL CITY	URBAN	X^2	DF	P
EVER HAD PET BIRD?	24.2 (16)	24.6 (2)	39.1 (18)	41.8 (38)	8.19	3	.0423

was the second most frequently reported activity. Eighty-seven percent had a pet during the previous year and 76% had a pet at the time of the survey (Table 72).

Significant differences were found among petowners with regard to race and area of residence (Table 73). A larger percentage of white children (83%) had a pet at the time of the interview than did black children (45%), and more whites (90%) than blacks (65%) had a pet during the previous year. Of the four areas of residence, fewer children living in urban areas (63%) had a pet than those from rural (86%), suburban (79%) or small city (83%) areas.

Dogs and cats were the most frequently owned pets. Forty-five percent of petowners said they owned a dog and another kind of domestic animal (of which 68% were cats) (Table 73). Twenty-nine percent owned a dog only, 14% owned a cat only, and 6% owned fish only. Significant differences were found in kinds of pets owned by black and white children and those owned by children from different areas of residence. The percentages of white children having a cat (14%) or a dog and another kind of pet (58%) was more than twice as large as the percentage of black children having these animals (7% and 22% respectively). Conversely, the percentage of black children having a dog only (59%) was more than twice as large as the percentage of white children having a dog only (23%). Of the four areas of residence, urban residents were most likely to own a dog only (44% of urban petowners) and rural children were most likely to own a dog and another kind of animal (71% of rural pet owners).

Regarding the reasons why children have their pets, 70% said "to play with and love" (Table 73). The percentage (49%) of second grade pet owners

Table 72

DOMESTIC ANIMAL PET OWNERSHIP
BY TOTAL POPULATION

	Percent of Total Population (N)	Percent of Domestic Petowners (N)
Have a pet (excluding birds and horses)	76.0 (203)	
Had pet last year	87.1 (230)	
Kind of pet		
Dog and other	39.0 (103)	44.8 (103)
Dog only	24.7 (66)	28.7 (66)
Cat only	11.6 (31)	13.5 (31)
Fish	5.2 (14)	6.1 (14)
Other	5.9 (16)	7.0 (16)
Main reason for liking pet		
Play with and love	60.7 (162)	69.8 (162)
Show, sport, money or protect	16.1 (43)	18.5 (43)
Pretty	10.1 (27)	11.6 (27)
Ever had horse	11.7 (31)	
When had horse		Percent of Horseowners (N)
Within past 2 years	7.2 (19)	61.3 (19)
More than 2 years ago	4.5 (12)	38.7 (12)

Table 73

DOMESTIC ANIMAL PET OWNERSHIP
BY SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS	PERCENT OF TOTAL				
RACE	WHITE POP. (N)	NONWHITE POP. (N)	X2	DF	P
HAVE A PET (EXCLUDING BIRDS AND HORSES)	82.6 (171)	45.2 (19)	26.97	1	.0000
HAD A PET LAST YEAR	90.3 (186)	65.0 (26)	17.99	1	.0000
KIND OF PET					
DOG AND OTHER	58.3 (109)	22.2 (6)			
DOG ONLY	23.0 (43)	59.3 (16)			
CAT ONLY	14.4 (27)	7.4 (2)			
FISH	4.3 (8)	11.1 (3)	19.97	3	.0002
MAIN REASON FOR LIKING PET					
SHOW, SPORT, MONEY OR PROTECT	17.7 (33)	32.1 (9)			

AREA OF RESIDENCE	RURAL	SUBURB	SMALL CITY	URBAN	X2	DF	P
HAVE A PET (EXCLUDING BIRDS AND HORSES)	86.4 (57)	79.0 (49)	83.0 (39)	62.6 (57)	14.34	3	.0025
KIND OF PET							
DOG AND OTHER	71.2 (42)	54.7 (29)	53.5 (23)	32.0 (24)			
DOG ONLY	15.3 (9)	26.4 (14)	23.3 (10)	44.0 (33)			
CAT ONLY	13.6 (8)	15.1 (8)	16.3 (7)	10.7 (8)			
FISH	0	3.8 (2)	7.0 (3)	12.0 (9)	31.81	12	.0015
EVER HAD HORSE	21.2 (14)	6.7 (4)	10.9 (5)	8.8 (8)	7.97	3	.0465
GRADE LEVEL	2ND	5TH	8TH	11TH			
MAIN REASON FOR LIKING PET							
PLAY WITH AND LOVE	49.1 (26)	72.1 (44)	76.2 (45)	79.6 (47)			
SHOW, SPORT, MONEY, OR PROTECT	32.1 (17)	22.9 (14)	8.5 (5)	11.9 (7)			

saying "to play with and love" was much lower than the other grade levels.

The knowledge scores of petowners were significantly higher than scores of non-petowners. Also, petowners had much higher scores on the humanistic and moralistic and much lower scores on the negativistic scales (Table 58).

HORSES

Having a horse was among the least frequent activities of the survey, reported by only 12% of the children (Table 72). Not surprisingly, children (21%) from rural areas were more likely to have had a horse than children from other areas of residence (Table 73).

Almost half (47%) of the children said they went horseback riding (Table 74). A similar percentage (41%) was reported by Pomerantz (51). In contrast, only 19% of adults in the national survey reported horseback riding. Blacks and children from urban areas were least likely to participate in this activity.

LIVESTOCK OWNERSHIP

Twenty-one percent of the children indicated their families had once raised livestock, and almost half (46%) said their grandparents had once owned a farm (Table 74). Not surprisingly, most children with families who had raised livestock were from rural areas of residence.

Table 74

HORSEBACK RIDING AND LIVESTOCK OWNERSHIP BY TOTAL POPULATION AND SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

TOTAL POPULATION	PERCENT OF TOTAL POPULATION(N)	PERCENT OF RIDERS(N)
WENT RIDING IN PAST 2 YEARS	47.0 (125)	
TIMES WENT RIDING		
1 - 2 DAYS	18.7 (50)	39.1 (50)
3 - 10 DAYS	17.9 (48)	37.5 (48)
11 OR MORE DAYS	11.2 (3)	23.4 (30)
FAMILY RAISED LIVESTOCK	20.8 (55)	
GRANDPARENTS OWNED A FARM	45.8 (109)	

SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS

AREA OF RESIDENCE	PERCENT OF TOTAL						
	RURAL(N)	SUBURB(N)	SMALL CITY(N)	URBAN(N)			
WENT RIDING IN PAST 2 YEARS	43.9 (29)	51.6 (32)	67.4 (31)	35.2 (32)	13.58	3	.0035
FAMILY RAISED LIVESTOCK	31.8 (21)	9.8 (6)	13.0 (6)	24.4 (22)	11.67	3	.0086
GRANDPARENTS OWNED A FARM	59.3 (35)	20.4 (11)	52.3 (23)	50.0 (40)	19.71	3	.0002

OVERVIEW

MOST AND LEAST FREQUENT ACTIVITIES

Three-quarters or more of the children participated in seven of the animal-related activities (Table 75). These activities included: going to the zoo (93%); having a pet (87%); fishing (87%); learning about animals in school (83%); feeding birds (82%); reading books or magazines about animals (76%); and watching "Wild Kingdom" (74%; eleventh grade only).

Six of these activities were among the 12 most frequently occurring activities in the national adult study. Activities reported by a majority of children but not a majority of adults included learning about animals in school and reading a book about animals.

Twenty-five percent or less of the children participated in the following eight activities: raising livestock (21%); hunting (18%); having a family member who trapped (17%); trapping (13%); being bitten by a dog (12%); having a horse at one time (12%); hurt by a wild animal (9%); and belonging to an animal club (8%).

It appears that children and adults were interested in the same kinds of animal-related activities, but activities popular with children covered a broader range than occurred among adults.

MOST FREQUENT ACTIVITIES BY SOCIODEMOGRAPHIC CHARACTERISTICS

There were significant differences in the number of whites and blacks participating in 14 animal-related activities. Whites were more likely than blacks to report greater participation in all but one of 14 activities; the

TABLE 75

MOST[1] AND LEAST[2] FREQUENT ANIMAL-RELATED ACTIVITIES

MOST FREQUENT ACTIVITIES	PERCENT OF TOTAL POPULATION ANSWERING YES
1. WENT TO ZOO	93.3
2. OWNED A PET	87.1
3. EVER FISHED	86.9
4. LEARNED ABOUT ANIMALS IN SCHOOL	82.8
5. FED BIRDS	82.3
6. READ A BOOK OR MAGAZINE ABOUT ANIMALS	75.6
7. WATCHED "WILD KINGDOM" [3]	73.5
LEAST FREQUENT ACTIVITIES	
1. BELONG TO ANIMAL CLUB	8.2
2. HURT BY A WILD ANIMAL	8.7
3. EVER HAD A HORSE	11.7
4. BITTEN BY A DOG	12.1
5. EVER TRAPPED	12.8
6. HAVE A FAMILY MEMBER WHO TRAPS	16.6
7. EVER HUNTED	17.6
8. FAMILY RAISED LIVESTOCK	20.8

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[1] INCLUDES ALL ACTIVITIES REPORTED BY 70% OR MORE OF THE TOTAL SAMPLE.

[2] INCLUDES ALL ACTIVITIES REPORTED BY 25% OR LESS OF THE TOTAL SAMPLE.

[3] INCLUDES 11TH GRADE CHILDREN ONLY.

one exception was more blacks had a family member who trapped (Table 76).

Activities occurring to a greater extent among urban children included owning birds and visiting zoos. Children from rural areas were more likely to participate in domestic animal-related activities as well as hunting, trapping and fishing. The relationship between area of residence and activity was significant for 22 of the activities (Table 77).

Hunting, fishing, and trapping were much more popular among male than female children (Table 78). Pomerantz also found several wildlife-related activities (e.g., birding, backpacking/hiking, and reading wildlife books) were more common among male seventh through twelfth graders. The present results indicate female participation was higher in only one activity -- looking at birds.

Second graders differed dramatically from the other grade levels (Table 79), exhibiting lowest levels of participation in most activities. Second and fifth graders did, however, reveal higher levels of participation in learning about animals in school and going on school trips to see animals.

KNOWLEDGE AND ATTITUDES AMONG MAJOR ACTIVITY GROUPS

This chapter will conclude by summarizing knowledge and attitude scale results among a number of animal-related activity groups. No attempt is made to assess statistical significance as the groups were not mutually exclusive.

The highest knowledge scores were obtained by children who hunted and belonged to an animal-related club or organization (Table 80). The lowest knowledge scores occurred among children who visited a zoological park and, ironically, learned about animals in school. The high knowledge scores of

TABLE 76

ACTIVITIES WITH SIGNIFICANT DIFFERENCES ($P<.05$) BETWEEN WHITE AND BLACK CHILDREN

	PERCENT OF TOTAL (N)				
ACTIVITY	WHITE POP.	BLACK POP.	X^2	DF	P
EVER HAD WILD ANIMAL AS A PET	35.3 (72)	19.0 (8)	4.19	1	.0407
HAVE A PET	82.6(171)	45.2 (19)	26.97	1	.0000
HAD A PET LAST YEAR	90.3(186)	65.0 (26)	17.99	1	.0000
KIND OF PET (% OF PET OWNERS) (EXCLUDING BIRDS AND HORSES)					
DOG	23.0 (43)	59.3 (16)			
CAT	14.4 (27)	7.4 (2)			
DOG AND OTHER	58.3(109)	22.2 (6)			
FISH	4.3 (8)	11.1 (3)	19.97	3	.0002
WENT HORSEBACK RIDING IN PAST TWO YEARS	51.5(106)	31.0 (13)	5.88	1	.0153
HAVE A FAMILY MEMBER WHO TRAPS	13.2 (27)	31.0 (13)	8.12	1	.0044
EVER GONE FISHING	90.8(188)	76.2 (32)	7.26	1	.0070
FREQUENCY OF FISHING IN PAST TWO YEARS					
1 - 2 DAYS	21.1 (35)	42.9 (12)			
3 - 10 DAYS	34.9 (58)	39.3 (11)			
11 OR MORE DAYS	44.0 (73)	17.9 (5)	8.88	2	.0118
FAMILY FEEDS BIRDS	84.5(174)	71.4 (30)	4.06	1	.0438
READ BOOKS ABOUT ANIMALS IN SCHOOL	88.7(126)	71.4 (25)	6.71	1	.0096
WATCHED MOVIES ABOUT ANIMALS IN SCHOOL	88.0(125)	74.3 (26)	4.23	1	.0397
DID EXPERIMENTS TO LEARN ABOUT ANIMALS	63.7 (79)	39.4 (13)	6.35	1	.0117
WILD ANIMALS HURT FAMILY'S GARDEN	42.4 (86)	4.9 (2)	20.79	1	.0000

TABLE 77

ACTIVITIES WITH SIGNIFICANT DIFFERENCES ($P<.05$) BETWEEN CHILDREN LIVING IN RURAL, SUBURBAN, SMALL CITY AND URBAN AREAS OF RESIDENCE

	PERCENT OF TOTAL (N)						
ACTIVITY	RURAL	SUBURBAN	SMALL CITY	URBAN	X^2	DF	P
EVER HAD A PET BIRD	24.2(16)	24.6 (2)	39.1(18)	41.8(38)	8.19	3	.0423
HAVE A PET	86.4(57)	79.0(49)	83.0(18)	62.6(57)	14.34	3	.0025
KIND OF PET (EXCL. BIRDS AND HORSES)							
DOG	15.3 (9)	26.4(14)	23.3(10)	44.0(33)			
CAT	13.6 (8)	15.1 (8)	16.3 (7)	10.7 (8)			
DOG AND OTHER	71.2(42)	54.7(29)	53.5(23)	32.0(24)			
FISH	0 (0)	3.8 (2)	7.0 (3)	12.0 (9)	31.81	12	.0015
EVER HAD HORSE	21.2(14)	6.7 (4)	10.9 (5)	8.8 (8)	7.97	3	.0465
WENT HORSEBACK RIDING IN PAST TWO YEARS	43.9(29)	51.6(32)	67.4(31)	35.2(32)	13.58	3	.0002
FAMILY RAISED LIVESTOCK	31.8(21)	9.8 (6)	13.0 (6)	24.4(22)	11.67	3	.0086
GRANDPARENTS OWNED A FARM	59.3(35)	20.4(11)	52.3(23)	50.0(40)	19.71	3	.0002
NUMBER OF FRIENDS WHO HUNT							
0	21.9(14)	60.0(36)	53.2(25)	41.4(36)			
1 - 2	29.7(19)	30.0(18)	21.3(10)	29.9(26)			
3 OR MORE	48.4(31)	10.0 (6)	25.5(12)	28.7(25)	29.03	6	.0001
HAVE A FAMILY MEMBER WHO HUNTS	54.5(36)	26.2(16)	46.8(22)	40.4(36)	11.04	3	.0111
NUMBER OF FRIENDS WHO TRAP							
0	52.5(32)	86.8(46)	80.0(36)	78.6(66)			
1 - 2	26.2(16)	9.4 (5)	17.8 (8)	11.9(10)			
3 OR MORE	21.3(13)	3.8 (2)	2.2 (1)	9.5 (8)	24.57	6	.0004
HAVE A FAMILY MEMBER WHO TRAPS	27.7(18)	4.9 (3)	14.9 (7)	17.6(16)	11.91	3	.0077
EVER GONE FISHING	90.9(60)	95.2(59)	95.7(45)	73.6(67)	21.88	3	.0001

TABLE 77 CONTINUED

ACTIVITIES WITH SIGNIFICANT DIFFERENCES ($P<.05$) BETWEEN CHILDREN LIVING IN RURAL, SUBURBAN, SMALL CITY AND URBAN AREAS OF RESIDENCE

	PERCENT OF TOTAL (N)						
ACTIVITY	RURAL	SUBURBAN	SMALL CITY	URBAN	X^2	DF	P
FREQUENCY OF FISHING PAST TWO YEARS							
1 - 2 DAYS	14.8 (8)	23.5(12)	22.5 (9)	35.1(20)			
3 - 10 DAYS	25.9(14)	39.2(20)	42.5(17)	38.6(22)			
11 OR MORE DAYS	59.3(32)	37.3(19)	35.0(14)	26.3(15)	15.13	6	.0193
FREQUENCY OF ZOO VISITATION							
1 - 2 TIMES	45.6(26)	45.8(27)	26.7(12)	19.5(17)			
3 - 10 TIMES	47.4(27)	25.8(27)	33.3(15)	49.4(43)			
11 OR MORE TIMES	7.0 (4)	8.5 (5)	40.0(18)	31.0(27)	33.56	6	.0000
READ A BOOK OR MAGAZINE ABOUT ANIMALS IN THE PAST YEAR	77.3(51)	83.9(52)	80.9(38)	65.6(59)	7.99	3	.0461
READ ABOUT ANIMALS IN SCHOOL	77.6(38)	97.1(33)	100.0(37)	77.5(77)	15.98	3	.0011
WATCHED MOVIES ABOUT ANIMALS IN SCHOOL	85.4(41)	100.0(34)	92.1(35)	74.6(53)	13.72	3	.0033
DID EXPERIMENTS TO LEARN ABOUT ANIMALS IN THE PAST TWO YEARS	57.1(28)	83.3(15)	70.6(24)	44.9(31)	11.77	3	.0082
WENT ON TRIP TO LEARN ABOUT ANIMALS	53.1(17)	57.9(11)	88.2(15)	27.9(19)	22.89	3	.0000
TEACHERS KEPT ANIMALS IN CLASSROOM WITHIN PAST TWO YEARS	44.8(24)	70.5(43)	59.6(28)	28.9(26)	28.39	3	.0000
WILD ANIMALS HURT FAMILY GARDEN	63.1(41)	36.7(22)	31.9(15)	12.4(11)	43.28	3	.0000

TABLE 78

ACTIVITIES WITH SIGNIFICANT DIFFERENCES ($P<.05$) BETWEEN MALE AND FEMALE CHILDREN

	PERCENT OF TOTAL (N)				
ACTIVITY	MALE	FEMALE	X^2	DF	P
EVER HUNTED	28.2 (37)	7.4 (10)	20.81	2	.0000
NUMBER OF FRIENDS WHO HUNT					
0	35.9 (46)	49.6 (65)			
1 - 2	29.7 (38)	27.5 (36)			
3 OR MORE	34.4 (44)	22.9 (30)	5.92	2	.0518
GO HUNTING WITH A FAMILY MEMBER	75.6 (31)	24.4 (10)	14.73	2	.0006
EVER TRAPPED	20.6 (27)	5.2 (7)	14.19	1	.0002
NUMBER OF FRIENDS WHO TRAP					
0	65.3 (79)	82.9(102)			
1 - 2	21.5 (26)	10.6 (13)			
3 OR MORE	13.2 (16)	6.5 (8)	9.91	2	.0071
EVER FISHED	94.7(124)	79.4(108)	13.61	1	.0002
FISHED IN PAST TWO YEARS	94.4(118)	76.6 (85)	15.53	1	.0001
FREQUENCY OF FISHING IN PAST TWO YEARS					
1 - 2 DAYS	16.1 (19)	35.3 (30)			
3 - 10 DAYS	29.7 (35)	45.9 (39)			
11 OR MORE DAYS	54.2 (64)	18.8 (16)	26.83	2	.0000
WENT OUTSIDE TO LOOK AT BIRDS	48.1 (63)	68.4 (93)	11.31	1	.0008

TABLE 79

ACTIVITIES WITH SIGNIFICANT DIFFERENCES ($P<.05$) BETWEEN SECOND, FIFTH, EIGHTH AND ELEVENTH GRADE STUDENTS

	PERCENT OF TOTAL (N)						
ACTIVITY	2ND	5TH	8TH	11TH	X^2	DF	P
NUMBER OF FRIENDS WHO HUNT							
0	61.7(37)	51.6(33)	36.4(24)	24.6(17)			
1 - 2	21.7(13)	28.1(18)	33.3(22)	30.4(21)			
3 OR MORE	16.7(10)	20.3(13)	30.3(20)	44.9(31)	24.73	6	.0004
FISHED IN PAST TWO YEARS	86.8(46)	91.7(55)	93.4(57)	72.6(45)	13.72	3	.0033
WENT OUTSIDE TO LOOK AT BIRDS	61.9(39)	66.2(45)	43.3(29)	62.3(43)	8.75	3	.0328
WENT TO A ZOO	77.8(49)	91.7(66)	100.0(67)	97.1(67)	32.04	3	.0000
HOW MANY TIMES GONE TO A ZOO IN PAST TWO YEARS?							
1 - 2	49.0(24)	24.2(16)	29.9(20)	34.3(23)			
3 - 10	46.9(23)	45.5(30)	44.8(30)	43.3(29)			
11 OR MORE	4.1	30.3(20)	25.4(17)	22.4(15)	15.28	6	.0182
READ A BOOK OR MAGAZINE ABOUT ANIMALS WITHIN THE PAST YEAR	68.3(43)	88.1(59)	74.6(50)	71.0(49)	8.29	3	.0403
LEARNED ABOUT ANIMALS IN SCHOOL IN PAST TWO YEARS?	90.0(54)	89.4(59)	75.8(50)	76.8(53)	8.22	3	.0417
READ ABOUT ANIMALS	68.2(30)	89.6(43)	89.1(41)	92.5(49)	13.72	3	.0033
DID EXPERIMENTS WITH ANIMALS	12.5 (4)	42.9(18)	68.2(30)	88.5(46)	52.70	3	.0000
WENT ON TRIPS TO SEE ANIMALS	63.2(24)	64.9(24)	33.3 (9)	14.7 (5)	24.98	3	.0000
TEACHER KEPT ANIMALS IN THE CLASSROOM WITHIN PAST TWO YEARS	52.4(33)	66.7(44)	47.8(32)	24.2(16)	24.63	3	.0000

TABLE 80

KNOWLEDGE SCALE MEAN SCORES BY SELECTED ANIMAL ACTIVITY GROUPS

	MEAN SCORE
EVER HUNTED	51.77
BELONG TO ANIMAL CLUB	51.23
FAMILY RAISED LIVESTOCK	47.09
WENT OUTSIDE TO LOOK AT BIRDS	45.85
HAVE A PET	45.76
EVER FISHED	45.63
LEARNED ABOUT ANIMALS IN SCHOOL	44.99
WENT TO ZOO	44.89

hunters and group members suggests the value of direct participatory contact with animals, particularly wildlife, as a means of fostering greater understanding of animals.

A more ecological perspective of animals was found among hunters and club members, as suggested by relatively high ecologistic scale scores (Table 81). Zoo visitors and children who learned about animals in school obtained the lowest ecologistic scores. The low knowledge and ecologistic scores of zoo visitors and children who learned about animals in school were particularly discouraging. One suspects the passive contact with animals provided by zoos, and the lack of exposure to living animals in their natural habitats provided by most school programs, contributes to relatively little knowledge of animals being associated with these activities.

Children who hunted and belonged to an animal club possessed the most utilitarian attitudes toward animals (Table 82). This perspective among children who hunt may be related to greater awareness of harvesting wild animals for their meat. The least utilitarian groups were children who owned pets and those who birdwatched. Additionally, birdwatchers and children who owned pets revealed the most protectionist attitudes toward animals, as reflected in very high moralistic scores (Table 83). In contrast, the lowest moralistic scores occurred among children who hunted. Children who fished and whose families raised livestock also had relatively low moralistic scale scores.

Children who hunted and whose families raised livestock had relatively high dominionistic scale scores (Table 84). In marked contrast, petowners and children belonging to an animal club had the lowest dominionistic scores.

Children who hunted, belonged to animal clubs and birdwatched had the

TABLE 81

ECOLOGISTIC SCALE MEAN SCORES BY SELECTED ANIMAL ACTIVITY GROUPS

	MEAN SCORE
BELONG TO ANIMAL CLUB	3.95
FAMILY RAISED LIVESTOCK	3.33
EVER HUNTED	3.32
HAVE A PET	3.21
WENT OUTSIDE TO LOOK AT BIRDS	3.10
EVER FISHED	3.06
LEARNED ABOUT ANIMALS IN SCHOOL	3.03
WENT TO ZOO	3.00

TABLE 82

UTILITARIAN SCALE MEAN SCORES BY SELECTED ANIMAL ACTIVITY GROUPS

	MEAN SCORE
BELONG TO ANIMAL CLUB	3.50
EVER HUNTED	3.45
EVER FISHED	3.31
LEARNED ABOUT ANIMALS IN SCHOOL	3.29
WENT TO ZOO	3.27
FAMILY RAISED LIVESTOCK	3.24
HAVE A PET	3.16
WENT OUTSIDE TO LOOK AT BIRDS	3.09

TABLE 83

MORALISTIC SCALE MEAN SCORES BY SELECTED ANIMAL ACTIVITY GROUPS

	MEAN SCORE
WENT OUTSIDE TO LOOK AT BIRDS	4.13
HAVE A PET	4.07
WENT TO ZOO	3.96
BELONG TO ANIMAL CLUB	3.91
LEARNED ABOUT ANIMALS IN SCHOOL	3.86
EVER FISHED	3.84
FAMILY RAISED LIVESTOCK	3.65
EVER HUNTED	3.36

TABLE 84

DOMINIONISTIC SCALE MEAN SCORES BY SELECTED ANIMAL ACTIVITY GROUPS

	MEAN SCORE
FAMILY RAISED LIVESTOCK	3.38
EVER HUNTED	3.09
WENT OUTSIDE TO LOOK AT BIRDS	2.97
EVER FISHED	2.96
LEARNED ABOUT ANIMALS IN SCHOOL	2.92
WENT TO ZOO	2.88
HAVE A PET	2.85
BELONG TO ANIMAL CLUB	2.73

highest naturalistic scale scores, perhaps reflecting their direct participatory involvement with wildlife (Table 85). The lowest naturalistic scores occurred among children who owned pets, raised livestock, visited a zoo or went fishing.

A strong emotional orientation to animals was most characteristic of children who owned pets and went birdwatching, as reflected in relatively high humanistic attitude scale scores (Table 86). Both groups also had the highest moralistic scale scores. Children who hunted, raised livestock and belonged to an animal club were the least humanistically-oriented of the activity groups.

Children who visited zoos and learned about animals in school had the highest negativistic scale scores (Table 87). In contrast, children who hunted and belonged to animal clubs had the lowest scores on this scale.

TABLE 85

NATURALISTIC SCALE MEAN SCORES BY SELECTED ANIMAL ACTIVITY GROUPS

	MEAN SCORE
BELONG TO ANIMAL CLUB	7.00
WENT OUTSIDE TO LOOK AT BIRDS	6.46
EVER HUNTED	6.32
LEARNED ABOUT ANIMALS IN SCHOOL	6.07
FAMILY RAISED LIVESTOCK	6.04
HAVE A PET	6.04
WENT TO ZOO	5.88
EVER FISHED	5.80

TABLE 86

HUMANISTIC SCALE MEAN SCORES BY SELECTED ANIMAL ACTIVITY GROUPS

	MEAN SCORE
WENT OUTSIDE TO LOOK AT BIRDS	4.52
HAVE A PET	4.48
LEARNED ABOUT ANIMALS IN SCHOOL	4.38
EVER FISHED	4.29
WENT TO ZOO	4.28
BELONG TO ANIMAL CLUB	4.23
FAMILY RAISED LIVESTOCK	4.22
EVER HUNTED	3.94

TABLE 87

NEGATIVISTIC SCALE MEAN SCORES BY SELECTED ANIMAL ACTIVITY GROUPS

	MEAN SCORE
WENT TO ZOO	5.94
LEARNED ABOUT ANIMALS IN SCHOOL	5.92
WENT OUTSIDE TO LOOK AT BIRDS	5.88
EVER FISHED	5.75
FAMILY RAISED LIVESTOCK	5.65
HAVE A PET	5.46
BELONG TO ANIMAL CLUB	5.18
EVER HUNTED	3.89

CHAPTER VIII

CHRONOLOGICAL SHIFTS IN PERSPECTIVES OF ANIMALS

A basic objective of the study was to determine if fundamental changes or shifts could be identified in the chronological evolution of children's activities, knowledge and attitudes toward animals. Previously cited results provided considerable information relevant to this consideration. In this chapter, at the risk of some repetition, this data will be reviewed. In addition, new information will be presented on the relation of attitudes to varying demographic groups distinguished by age.

Chapters three and four described age group differences in attitudes and knowledge of animals. Very significant variations were noted when comparing second graders with older children, particularly on the negativistic, utilitarian and knowledge scales. Second graders were far more detached, fearful and pragmatically oriented to animals than older children. Additionally, activity results suggested far less participation among the youngest children in most behavioral opportunities involving animals.

Major shifts were observed among 5th and 8th graders on the knowledge and ecologistic scales. In general, the transition from 5th to 8th grade appeared to signify basic changes in intellectual and cognitive understandings of animals. In contrast, differences between 2nd and 5th graders seemed to emphasize more fundamental changes in affective and emotional concern for animals.

Eleventh graders revealed far greater ecologistic, moralistic and naturalistic attitudes toward animals than 8th graders. Animal-related activity results also suggested 11th grade children were more interested in direct participatory contact and recreational enjoyment of wildlife and the out-of-doors. Thus, the most basic change occurring among older children, involved a far greater ethical concern for animals and a keener appreciation of wildlife in relation to natural habitats.

In summary, three major transitions were suggested by the activity, knowledge and attitude results. The period from 2nd to 5th grade was marked most of all by a major increase in emotional concern and affection for animals. The years between 5th and 8th grade were characterized by a very major increases in factual and cognitive understanding of animals. Finally, the change from 8th to 11th grade was related to a dramatic expansion in ethical and ecological concern for animals and the natural environment, as well as a significant increase in outdoor recreational and wildlife interest.

Some additionally interesting results emerged when attitude and knowledge scale differences were examined among age groups distinguished by varying demographic characteristics. Differences among second grade male and female children were inconsequential on the knowledge, ecologistic and moralistic scales. At all other age levels, however, particularly 11th grade, male/female differences were large and often highly significant (Table 88). An increase in moralistic concern among female students from 8th to 11th grades was particularly impressive. Male children, on the other hand, became far more knowledgeable and concerned about wildlife and natural environments as they grew older.

Male/female differences on the humanistic, dominionistic and negativistic attitude scales remained consistently significant throughout the various grade levels. In general, male children at all age levels were more oriented

TABLE 88

SEX BY GRADE BY ATTITUDE AND KNOWLEDGE SCALES

	2ND		5TH		8TH		11TH	
DOMINIONISTIC								
MALE	5.06		4.28		2.33		2.79	
FEMALE	4.20		2.36		1.59		1.50	
SIG.		.195		.002		.199		.016
ECOLOGISTIC								
MALE	2.39		2.56		3.52		4.94	
FEMALE	1.70		2.31		2.56		3.67	
SIG.		.171		.605		.152		.031
HUMANISTIC								
MALE	4.09		4.06		3.39		4.18	
FEMALE	4.67		4.44		4.65		4.83	
SIG.		.260		.547		.039		.246
MORALISTIC								
MALE	3.48		4.13		3.33		3.97	
FEMALE	3.70		3.50		3.56		5.39	
SIG.		.648		.345		.700		.028
NATURALISTIC								
MALE	6.03		5.25		5.21		6.61	
FEMALE	5.73		5.78		5.15		7.06	
SIG.		.645		.489		.932		.603

TABLE 88 CONTINUED

SEX BY GRADE BY ATTITUDE AND KNOWLEDGE SCALES

	2ND		5TH		8TH		11TH	
NEGATIVISTIC								
MALE	7.67		6.06		3.91		3.09	
FEMALE	10.03		6.50		6.29		4.92	
SIG.		.011		.649		.012		.030
UTILITARIAN								
MALE	4.61		2.94		3.36		3.06	
FEMALE	3.80		3.28		2.76		2.50	
SIG.		.159		.477		.243		.224

KNOWLEDGE								
MALE	29.8		43.6		56.6		58.1	
FEMALE	31.3		36.2		46.0		52.4	
SIG.		.650		.089		.006		.165

toward dominating and controlling animals, whereas female children were more inclined toward strong emotional attachments to individual, typically pet animals, although disposed to manifest less interest for animals in general, particularly wildlife.

Major ethnic variations in knowledge and understanding of animals were observed at all age levels (Table 89). Additionally, knowledge variations between white and nonwhite children were as great in 2nd as 11th grade. Knowledge scores among 11th grade blacks were not much higher than 2nd grade and lower than 5th grade white children.

Few major changes occurred among residential groups when controlling for age level (Table 90). One exception was the higher knowledge scores of rural 2nd and 11th graders. The knowledge scores of suburban children also changed markedly. Indicative of this change, 2nd grade rural children had substantially higher knowledge scores than suburban children; but, by 11th grade, the highest knowledge scores were found among suburban children. Negativistic attitudes among suburban children also strikingly decreased between 8th and 11th grade.

The results of this chapter suggest major changes in basic perceptions of animals at varying age levels. This finding somewhat contrasts with the conclusions of La Hart (34), Giles (20), Baddaracco (3) and others who have emphasized the period from 7th to 9th grade as the most critical developmental period in children's perceptions of animals and the environment. Our study indicates the importance of this age period but, in addition, reveals major changes occurring at other age levels. To recapitulate, the transition from 2nd to 5th grade primarily involved a

TABLE 89

ETHNICITY BY GRADE BY ATTITUDE AND KNOWLEDGE SCALES

	2ND	5TH	8TH	11TH
DOMINIONISTIC				
WHITE	4.38	2.92	1.61	2.21
NONWHITE	5.75	4.25	2.55	1.86
SIG.	.112	.102	.196	.703
ECOLOGISTIC				
WHITE	2.21	2.80	3.20	4.32
NONWHITE	1.33	1.33	2.64	4.00
SIG.	.187	.024	.550	.754
HUMANISTIC				
WHITE	4.52	4.51	4.27	4.35
NONWHITE	3.75	3.17	3.09	4.29
SIG.	.242	.108	.157	.943
MORALISTIC				
WHITE	3.54	3.84	3.75	4.42
NONWHITE	3.58	3.67	2.27	5.29
SIG.	.945	.845	.069	.414
NATURALISTIC				
WHITE	5.94	5.94	5.31	6.75
NONWHITE	5.58	4.25	3.91	7.29
SIG.	.674	.098	.182	.715

TABLE 89 CONTINUED

ETHNICITY BY GRADE BY ATTITUDE AND KNOWLEDGE SCALES

	2ND	5TH	8TH	11TH
NEGATIVISTIC				
WHITE	8.54	5.51	4.76	3.89
NONWHITE	9.25	8.67	6.36	4.86
SIG.	.561	.012	.210	.512
UTILITARIAN				
WHITE	4.00	2.84	2.96	2.81
NONWHITE	4.92	4.42	3.64	2.43
SIG.	.216	.011	.335	.626

KNOWLEDGE				
WHITE	34.1	41.1	54.6	57.8
NONWHITE	19.7	30.0	41.7	39.0
SIG.	.000	.059	.012	.007

TABLE 90

RESIDENTIAL GROUPS BY GRADE BY ATTITUDE AND KNOWLEDGE SCALES

	2ND	5TH	8TH	11TH
DOMINIONISTIC				
RURAL	3.87	1.83	1.68	2.40
SUBURBAN	4.38	3.29	0.71	1.29
SMALL CITY	7.67	3.73	2.10	2.80
URBAN	4.67	3.81	2.60	1.91
SIG.	.019	.167	.299	.487
ECOLOGISTIC				
RURAL	3.00	2.67	3.16	4.20
SUBURBAN	2.12	3.21	3.86	5.43
SMALL CITY	2.67	2.09	2.30	4.50
URBAN	1.00	1.57	3.40	4.00
SIG.	.026	.047	.492	.573
HUMANISTIC				
RURAL	4.27	4.17	4.21	4.50
SUBURBAN	4.50	4.33	4.86	4.00
SMALL CITY	4.17	5.45	4.40	3.80
URBAN	4.33	3.62	3.40	4.87
SIG.	.978	.303	.466	.567
MORALISTIC				
RURAL	3.13	3.92	2.84	4.15
SUBURBAN	3.79	3.17	6.43	5.29
SMALL CITY	4.17	4.36	3.55	5.50
URBAN	3.50	4.14	2.85	4.69
SIG.	.618	.550	.002	.571

TABLE 90 CONTINUED

RESIDENTIAL GROUPS BY GRADE BY ATTITUDE AND KNOWLEDGE SCALES

	2ND	5TH	8TH	11TH
NATURALISTIC				
RURAL	6.47	6.17	5.68	7.80
SUBURBAN	5.63	4.96	7.57	7.43
SMALL CITY	5.83	7.55	4.25	6.60
URBAN	5.78	4.76	4.80	6.19
SIG.	.790	.061	.081	.433
NEGATIVISTIC				
RURAL	8.13	3.92	4.58	3.40
SUBURBAN	8.67	6.63	2.43	0.86
SMALL CITY	9.17	4.45	5.95	5.20
URBAN	9.39	8.24	5.95	4.78
SIG.	.806	.005	.143	.027
UTILITARIAN				
RURAL	3.73	2.58	3.53	2.40
SUBURBAN	4.54	3.29	1.00	2.57
SMALL CITY	4.33	2.09	3.45	3.00
URBAN	4.17	3.76	2.95	2.97
SIG.	.761	.090	.035	.731
KNOWLEDGE				
RURAL	41.2	40.8	58.0	62.9
SUBURBAN	31.8	42.3	57.6	68.0
SMALL CITY	27.3	41.1	52.6	53.4
URBAN	20.9	35.1	40.4	47.9
SIG.	.000	.583	.002	.002

substantial increase in emotional concern and affinity for animals. From 5th to 8th grade, a dramatic expansion in cognitive and intellectual understanding of animals was observed. The period from 8th to 11th grades witnessed major increases in moral, ethical and ecological concern for animals and the natural environment. All three transitional periods were, thus, characterized by major changes in basic perceptions and understanding of animals. Each period, therefore, represents important, although varying opportunities for environmental education.

CHAPTER IX

PREFERENCES FOR ANIMALS

Children's preferences for animals were examined using three different techniques — a semantic differential; a ranking of the children's three favorite animals; and, a 33 animal preference measure, also used in the national survey of adults.

SEMANTIC DIFFERENTIAL

Children were asked to indicate their feelings about five animals (dog, eagle, bear, wolf, and rattlesnake) according to a set of seven bipolar adjectives — like/dislike, good/bad, interesting/boring, kind/mean, unscary/scary, pretty/ugly, and smart/stupid. The children rated the animals on these adjectives using a one to five scale.

With few exceptions, the rank of an animal on the like/dislike scale was the same rank it held on the other 6 adjectives (Table 91). If an animal was liked a great deal, it was generally perceived to be better, more interesting, smarter, kinder, prettier, and less scary.

The dog ranked highest on the like/dislike scale, followed by the eagle, bear, wolf and rattlesnake. Accordingly, the dog was also perceived to be the best, smartest, kindest, and least scary animal. The rattlesnake, the least liked animal, was also regarded as the worst, most boring, stupidest, meanest, ugliest and scariest animal.

There were many significant differences between the four grade levels in perceptions of these five animals. In general, an increase in positive perceptions of the five animals was observed from second to eleventh grades (Table 92). Lowest opinions were typically held by second graders and

TABLE 91

RELATIVE RANK OF ADJECTIVE SCALE MEAN SCORES*

	MEAN SCORE (RANK)				
	DOG	EAGLE	BEAR	WOLF	RATTLESNAKE
LIKE/DISLIKE	1.35 (1)	1.94 (2)	2.43 (3)	2.63 (4)	3.64 (5)
GOOD/BAD	1.55 (1)	1.96 (2)	2.92 (3)	3.23 (4)	3.72 (5)
INTERESTING/BORING	1.69 (2)	1.52 (1)	1.80 (3)	2.05 (4)	2.36 (5)
SMART/STUPID	1.71 (1)	1.83 (2)	2.50 (4)	2.11 (3)	2.77 (5)
KIND/MEAN	1.83 (1)	2.68 (2)	3.44 (3)	3.57 (4)	4.01 (5)
PRETTY/UGLY	1.84 (2)	1.82 (1)	2.69 (4)	2.31 (3)	3.53 (5)
NOT SCARY/SCARY	2.15 (1)	2.33 (2)	3.71 (4)	3.55 (3)	4.11 (5)

*BASED ON A SCALE FROM 1 - 5, 1 REPRESENTING THE MOST POSITIVE SCORE ON A SCALE AND 5 REPRESENTING THE MOST NEGATIVE SCORE ON A SCALE.

TABLE 92

SIGNIFICANT DIFFERENCES BETWEEN ADJECTIVE SCALE MEAN SCORES* OF GRADE LEVELS

		MEAN SCORE OF GRADE LEVEL					
ANIMAL	ADJECTIVE SCALE	2	5	8	11	F	SIG F
DOG	PRETTY/UGLY	1.60	1.85	2.13	1.75	3.66	.0130
	SMART/STUPID	1.59	1.72	1.99	1.54	3.45	.0173
EAGLE	LIKE/DISLIKE	2.24	1.99	2.01	1.54	4.21	.0063
	GOOD/BAD	2.25	2.09	1.97	1.54	4.21	.0044
	NOT SCARY/SCARY	2.44	2.54	2.36	1.97	2.63	.0504
	PRETTY/UGLY	2.00	1.87	1.97	1.47	2.99	.0316
BEAR	LIKE/DISLIKE	2.92	2.37	2.40	2.06	5.08	.0020
	GOOD/BAD	3.70	2.93	2.78	2.33	15.30	.0000
	KIND/MEAN	3.92	3.28	3.34	3.24	5.61	.0010
	SMART/STUPID	2.86	2.22	2.57	2.37	3.48	.0164
WOLF	GOOD/BAD	3.83	3.31	3.09	2.72	8.80	.0000
	INTERESTING/BORING	2.46	1.93	1.89	1.93	3.20	.0240
	KIND/MEAN	4.00	3.43	3.49	3.40	3.77	.0112
	SMART/STUPID	2.52	1.91	2.22	1.82	5.31	.0014
RATTLESNAKE	GOOD/BAD	4.40	3.85	3.64	3.04	14.53	.0000
	INTERESTING/BORING	2.87	2.22	2.13	2.24	3.64	.0133
	KIND/MEAN	4.35	4.07	3.94	3.69	4.52	.0041

*BASED ON A SCALE FROM 1 - 5, 1 REPRESENTING THE MOST POSITIVE SCORE ON A SCALE AND 5 REPRESENTING THE MOST NEGATIVE SCORE ON A SCALE.

highest opinions by eleventh graders. Second graders had the worst regard for the wolf and rattlesnake, a finding also reported by Johnson (27) and Morris (45).

FAVORITE ANIMAL

When each child was asked to name their favorite animal, most (34%) indicated the dog (Table 93). An almost equal percentage named the horse (15%) and the cat (14%) as their favorite animal. The remaining 38% of the sample named 37 other animals ranging from dolphins to guinea pigs.

ANIMAL PREFERENCE SCALE

Additional information on affection for specific animals was obtained by a 33 animal preference scale involving five response alternatives: really like, like, don't know, don't like, and really don't like. This measure was similar to one used in the national survey, except the range of responses in the children's study was 1 to 5 instead of 1 - 7 (Table 94).

The three most preferred animals were all well known and the only domestic animals in the scale -- the dog, horse and cat. The dog and horse were also the two most preferred animals in the adult survey (Table 95). In marked contrast, the cat ranked twelfth among adults.

The next most preferred species among children were the butterfly, swan, and robin -- all relatively familiar and aesthetically appealing animals. The raccoon was the next most liked animal, ranking 7th. The raccoon, like the cat, ranked much lower (14th) in the adult survey. This disparity between children and adult perceptions of the raccoon might be due to the likelihood of adults being more aware of the potentially destructive

TABLE 93

MOST FAVORITE ANIMAL
OF TOTAL POPULATION AND GRADE LEVELS

ANIMAL	PERCENT (N) OF GRADE LEVEL 2	5	8	11	TOTAL POP.
DOG	24.6 (15)	36.9 (24)	35.4 (23)	36.8 (25)	33.6 (87)
HORSE	6.6 (4)	18.5 (12)	21.5 (14)	11.8 (8)	14.7 (38)
CAT	21.3 (13)	9.2 (6)	10.8 (7)	14.7 (10)	13.9 (36)
OTHER (37 DIFFERENT ANIMALS)	47.5 (29)	35.4 (23)	52.3 (21)	47.7 (25)	37.8 (98)

TABLE 94

ANIMAL PREFERENCE FREQUENCY DISTRIBUTION

PERCENT (N) OF POPULATION RESPONDING

ANIMAL	REALLY LIKE		LIKE		DON'T KNOW		DISLIKE		REALLY DISLIKE	
1. DOG	77.8	(207)	19.5	(52)	0	(0)	1.1	(3)	1.5	(4)
2. HORSE	61.7	(163)	35.6	(94)	1.1	(3)	1.1	(3)	.4	(1)
3. CAT	56.2	(149)	35.1	(93)	1.9	(5)	5.7	(15)	1.1	(3)
4. BUTTERFLY	42.5	(113)	44.7	(119)	8.3	(22)	4.1	(11)	.4	(1)
5. SWAN	42.6	(113)	42.6	(113)	10.6	(28)	3.0	(8)	1.1	(3)
6. ROBIN	32.6	(86)	58.7	(155)	4.2	(11)	2.7	(7)	1.9	(5)
7. RACCOON	43.2	(115)	41.7	(111)	5.6	(15)	5.6	(15)	3.8	(10)
8. TURTLE	27.4	(73)	59.0	(157)	7.1	(19)	4.5	(12)	1.9	(5)
9, EAGLE	38.7	(103)	43.6	(116)	5.3	(14)	9.0	(24)	3.4	(9)
10. OWL	26.7	(21)	56.4	(150)	9.4	(25)	5.6	(15)	1.9	(5)
11. ELEPHANT	22.6	(60)	60.0	(159)	9.8	(26)	6.4	(17)	1.1	(3)
12. LADYBUG	26.9	(71)	49.2	(130)	22.4	(30)	10.2	(27)	2.3	(6)
13. TROUT	20.4	(53)	52.7	(137)	17.3	(45)	7.3	(19)	2.3	(6)
14. WHALE	25.6	(68)	48.1	(128)	11.3	(30)	8.3	(22)	6.8	(18)
15. SALMON	15.3	(40)	52.3	(137)	20.2	(53)	8.8	(23)	3.4	(9)
16. BEAR	17.7	(47)	50.0	(133)	13.2	(35)	13.5	(36)	5.6	(15)
17. WALRUS	17.9	(47)	46.8	(123)	17.1	(45)	13.3	(35)	4.9	(13)
18. FROG	11.2	(30)	55.8	(149)	13.9	(37)	17.2	(46)	1.9	(5)
19. MOOSE	16.5	(44)	41.4	(110)	26.6	(60)	15.4	(41)	4.1	(11)
20. COYOTE	17.4	(46)	40.0	(106)	18.5	(49)	19.2	(51)	4.9	(13)
21. WOLF	15.8	(42)	36.2	(96)	12.1	(32)	24.5	(56)	11.3	(30)
22. GORILLA	5.7	(15)	42.8	(113)	23.1	(61)	19.7	(52)	8.7	(23)
23. LIZARD	11.7	(31)	36.8	(98)	14.7	(39)	25.9	(69)	10.9	(29)
24. CROW	8.3	(22)	34.8	(92)	18.6	(49)	30.7	(81)	7.6	(20)
25. SHARK	8.7	(23)	23.3	(75)	10.2	(27)	30.2	(80)	22.6	(60)
26. VULTURE	5.7	(15)	17.1	(45)	25.9	(68)	33.1	(87)	18.3	(48)
27. SKUNK	6.8	(18)	25.6	(68)	12.4	(33)	26.6	(68)	29.7	(79)
28. BAT	6.8	(18)	17.7	(47)	15.4	(41)	39.1	(104)	21.1	(56)
29. RATTLESNAKE	6.4	(17)	15.0	(40)	7.5	(20)	37.2	(99)	33.8	(90)
30. RAT	4.5	(12)	13.2	(35)	4.9	(13)	46.0	(122)	31.3	(83)
31. WASP	2.3	(6)	9.1	(24)	10.6	(28)	45.8	(121)	32.2	(85)
32. MOSQUITO	2.3	(6)	4.9	(13)	4.9	(13)	47.4	(126)	40.8	(108)
33. COCKROACH	1.5	(4)	4.6	(12)	7.6	(20)	34.0	(89)	52.3	(137)

TABLE 95

RANK ORDER OF ANIMAL PREFERENCE MEAN SCORES* IN CHILDREN AND ADULT STUDIES

RANK IN CHILDREN'S (ADULT STUDY RANK)	ANIMAL	$\bar{X}$	STANDARD DEVIATION	RANK IN CHILDREN'S (ADULT STUDY RANK)	ANIMAL	$\bar{X}$	STANDARD DEVIATION
1. (1)	DOG	1.29	.68	18. (19)	FROG	2.43	.95
2. (2)	HORSE	1.43	.62	19. (15)	MOOSE	2.49	1.07
3. (12)	CAT	1.60	.83	20. (22)	COYOTE	2.54	1.13
4. (5)	BUTTERFLY	1.75	.74	21. (21)	WOLF	2.79	1.27
5. (3)	SWAN	1.77	.83	22. (20)	GORILLA	2.83	1.06
6. (4)	ROBIN	1.83	.77	23. (24)	LIZARD	2.88	1.22
7. (14)	RACCOON	1.85	1.02	24. (23)	CROW	2.94	1.13
8. (11)	TURTLE	1.94	.82	25. (26)	SHARK	3.30	1.32
9. (8)	EAGLE	1.95	1.03	26. (27)	VULTURE	3.41	1.14
10. (10)	OWL	2.00	.87	27. (25)	SKUNK	3.46	1.14
11. (9)	ELEPHANT	2.03	.83	28. (28)	BAT	3.50	1.20
12. (13)	LADYBUG	2.12	.98	29. (29)	RATTLESNAKE	3.77	1.24
13. (6)	TROUT	2.18	.91	30. (31)	RAT	3.86	1.12
14. (16)	WHALE	2.23	1.11	31. (30)	WASP	3.97	1.00
15. (7)	SALMON	2.33	.95	32. (32)	MOSQUITO	4.19	.91
16. (18)	BEAR	2.39	1.08	33. (33)	COCKROACH	4.31	.91
17. (17)	WALRUS	2.41	1.07	OVERALL SAMPLE MEAN = 2.60			

*THE LOWER THE MEAN SCORE, THE GREATER THE PREFERENCE. THE RESPONSE RANGE FOR THE CHILDREN'S STUDY WAS 1 = REALLY LIKE, 2 = LIKE, 3 = DON'T KNOW, 4 = DISLIKE, 5 = REALLY DISLIKE.

characteristics of raccoons -- e.g., as carriers of rabies, garden pests and as marauders of campsites and trash cans.

The turtle, eagle, owl and elephant ranked 8th through 11th. Although the ladybug, the 12th best liked animal, did not fare as well as the butterfly, its relatively high rank suggests the importance of aesthetics in perceptions of invertebrates.

The trout ranked 13th in the children's study, in contrast to its 6th position in the adult survey. Similarly, the salmon held 15th position in the present study, but ranked 7th in the adult survey. These differences might be attributed to a greater interest among adults in game species.

A somewhat surprising result was the whale's 14th rank between the trout and salmon. We had expected the whale to rank considerably higher because of extensive media coverage and school programs devoted to the study and preservation of whales in recent years. The midpoints of the preference spectrum, 16th and 17th place, were represented by the bear and walrus, and the frog and moose ranked 18th and 19th. Perceptions of the coyote and wolf were relatively the same among children and adults, ranking 20th and 21st in the children's study. Like the whale, we had expected the wolf to rank much higher, due to favorable media attention received by this animal in recent years.

All animals in the least liked third of the preference spectrum (ranks 23 - 33) had the same status in the adult survey. Eight of the 11 least preferred animals -- the cockroach, mosquito, wasp, rat, rattlesnake, bat, skunk and shark -- are typically associated with harm to people. It should be noted the highest degree of children's ambivalence toward animals occurred among these eleven least liked animals, as reflected in relatively high standard deviation scores.

Differences were not significant among varying grade levels in overall mean animal preference score (Table 96). Significant differences among grade levels, however, were found for 16 individual animals (Table 97). An increase in favorable perceptions of animals among older children was discovered for the eagle, whale, bear, walrus, wolf, gorilla, and skunk. A decline in favorable perceptions from second to eleventh grades was found for only three animals -- the cat, crow and rat. A significant decrease in favorable perceptions from the second to eighth grades and an increase in favorable perceptions from the eighth to eleventh grades occurred for the frog, ladybug, butterfly, turtle, robin and swan.

Among other demographic groups, males generally liked the 33 animals more than female children, whites more than nonwhite children, and the degree of overall animal preference tended to decrease with population size (Table 96).

Animal preferences were further examined by computing mean scores for animals grouped according to nine generic categories -- soft (e.g., cat), attractive (e.g., ladybug), domestic (e.g., dog), unattractive (e.g., vulture), large (e.g., gorilla), small, dangerous (e.g., shark), invertebrates (e.g., mosquito) and predators (e.g., wolf).

The three most preferred animal categories were domestic, soft and attractive animals (Table 98). The three least preferred were unattractive, dangerous and invertebrate animals. These results are consistent with those reported in the national adult survey.

Seven of the nine categories were significantly associated with grade level (Table 99). Except for "large" animals and "predators", these

TABLE 96

ANIMAL PREFERENCE MEAN SCORES FOR 33 ANIMAL SCALE BY DEMOGRAPHIC GROUPS*

	MEAN	F	SIG F
GRADE LEVEL			
SECOND	2.57		
FIFTH	2.66		
EIGHTH	2.69		
ELEVENTH	2.49	2.44	.0645
SEX			
MALE	2.54		
FEMALE	2.66	4.69	.0312
RACE			
WHITE	2.56		
NONWHITE	2.79	8.67	.0035
AREA OF RESIDENCE			
RURAL	2.47		
SUBURB	2.59		
SMALL CITY	2.55		
URBAN	2.72	3.99	.0084
OVERALL MEAN OF TOTAL POPULATION	2.60		

*THE LOWER THE MEAN SCORE, THE GREATER THE PREFERENCE. THE RESPONSE RANGE WAS 1 = REALLY LIKE, 2 = LIKE, 3 = DON'T KNOW, 4 = DON'T LIKE, 5 = REALLY DON'T LIKE.

TABLE 97

SIGNIFICANT DIFFERENCES BETWEEN ANIMAL PREFERENCE MEAN SCORES* OF GRADE LEVELS

RELATIONSHIP BETWEEN ANIMAL PREFERENCE AND AGE	ANIMAL	MEAN SCORE (N) OF GRADE LEVEL					
		2	5	8	11	F	SIG F
POSITIVE INCREASE IN PREFERENCE FROM 2ND TO 11TH GRADES	EAGLE	2.05 (63)	2.19 (68)	2.05 (66)	1.52 (69)	5.65	.0009
	WHALE	2.41 (63)	2.43 (67)	2.13 (67)	1.94 (69)	3.02	.0302
	BEAR	2.57 (63)	2.60 (67)	2.36 (67)	2.07 (69)	3.40	.0184
	WALRUS	2.55 (60)	2.60 (67)	2.40 (67)	2.10 (69)	2.95	.0333
	WOLF	3.08 (63)	2.87 (67)	2.87 (67)	2.38 (68)	3.59	.0143
	GORILLA	3.08 (61)	3.00 (68)	2.83 (66)	2.43 (69)	4.92	.0024
	SKUNK	4.14.(63)	3.58 (67)	3.15 (67)	3.01 (69)	10.97	.0000
NEGATIVE INCREASE IN PREFERENCE FROM 2ND TO 11TH GRADES	CAT	1.18 (62)	1.57 (68)	1.71 (66)	1.91 (69)	9.01	.0000
	CROW	2.69 (62)	2.81 (67)	3.18 (66)	3.07 (69)	2.64	.0503
	RAT	3.57 (63)	3.79 (66)	4.06 (67)	4.01 (69)	2.62	.0515
NEGATIVE INCREASE IN PREFERENCE FROM 2ND TO 8TH GRADES AND DECREASE FROM 8TH TO 11TH GRADES	FROG	2.14 (63)	2.41 (68)	2.72 (67)	2.42 (69)	3.97	.0086
	LADYBUG	1.87 (62)	2.15 (67)	2.36 (66)	2.07 (69)	2.75	.0433
	BUTTERFLY	1.22 (63)	1.76 (67)	2.10 (67)	1.88 (69)	16.46	.0000
	TURTLE	1.67 (63)	1.98 (67)	2.16 (67)	1.96 (69)	4.04	.0078
	ROBIN	1.55 (62)	1.79 (67)	2.09 (67)	1.85 (68)	5.44	.0012
	SWAN	1.58 (62)	1.78 (67)	2.00 (67)	1.72 (69)	2.85	.0380

*THE LOWER THE MEAN SCORE, THE GREATER THE PREFERENCE. THE RESPONSE RANGE WAS 1 = REALLY LIKE, 2 = LIKE, 3 = DON'T KNOW, 4 = DON'T LIKE, 5 = REALLY DON'T LIKE.

TABLE 98

SIGNIFICANT DIFFERENCES BETWEEN GENERIC CATEGORY MEAN SCORES* OF GRADE LEVELS

GENERIC CATEGORY	MEAN SCORE (N) OF GRADE LEVEL 2	5	8	11	F	SIG F
DOMESTIC	1.24 (61)	1.42 (66)	1.54 (66)	1.56 (68)	6.19	.0004
SOFT	1.38 (61)	1.53 (66)	1.64 (66)	1.61 (69)	6.19	.0108
ATTRACTIVE	1.45 (58)	1.70 (65)	1.89 (66)	1.75 (68)	11.27	.0000
LARGE	2.36 (57)	2.42 (66)	2.29 (66)	2.05 (68)	5.41	.0013
SMALL	2.63 (50)	2.89 (62)	3.01 (66)	2.86 (68)	6.92	.0002
PREDATORS	2.87 (56)	2.89 (66)	2.82 (66)	2.57 (68)	3.11	.0271
INVERTEBRATES	3.08 (57)	3.26 (65)	3.45 (66)	3.17 (69)	4.29	.0056

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*THE LOWER THE MEAN SCORE, THE GREATER THE PREFERENCE. THE RESPONSE RANGE WAS 1 = REALLY LIKE, 2 = LIKE, 3 - DON'T KNOW, 4 = DON'T LIKE, 5 = REALLY DON'T LIKE.

TABLE 99

ANIMAL PREFERENCE MEAN SCORES*

FOR SELECTED GENERIC CATEGORIES OF TOTAL POPULATION

RANK	GENERIC CATEGORY	MEAN SCORE
1.	DOMESTIC	1.44
2.	SOFT	1.54
3.	ATTRACTIVE	1.71
4.	LARGE	2.28
5.	PREDATOR	2.78
6.	SMALL	2.86
7.	INVERTEBRATE	3.27
8.	DANGEROUS	3.36
9.	UNATTRACTIVE	3.58

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*THE LOWER THE MEAN SCORE, THE GREATER THE PREFERENCE. THE RESPONSE RANGE WAS 1 = REALLY LIKE, 2 = LIKE, 3 = DON'T KNOW, 4 = DON'T LIKE, 5 = REALLY DON'T LIKE.

categories were liked most by second graders. These results also supported Badaracco's (3) finding that interest in insects decreases as children grow older.

CHAPTER X

CONCLUSION

The results of this study must be regarded as tentative and suggestive at this point. Remarkably little investigation has focused on children's relationships to animals and, thus, any research on this topic is necessarily exploratory. Relatedly, research methodologies of children's perceptions of animals are relatively undeveloped, particularly in the case of very young children. The tentativeness of the research findings are further suggested by the restricted sample size and location in Connecticut only. The findings of this investigation should, therefore, suggest possibilities for more thorough and precise future investigation, hopefully, involving more refined methodologies, a larger and random national sample and, if possible, a longitudinal research design.

Despite the limited nature of the investigation, a number of results indicate some important aspects of children's relationships to animals. Perhaps the most provocative finding was the intimation of three major developmental stages in the evolution of children's perceptions of animals.

The first stage, occurring from 2nd to 5th grade, was characterized by a dramatic increase in emotional concern and general affection for animals. Prior to this period, young children manifested very narrow interests in animals, primarily domestic animals and those yielding direct material benefits and satisfactions. Additionally, second graders revealed very little feeling and sympathy for the presumed needs and emotional experiences of animals. By fifth grade, however, most children were far more aware and emotionally attached to animals.

The views of 2nd graders were somewhat surprising. A tendency exists in our society to idealize the perceptions and presumably benign relations to animals of very young children. The inclination exists to believe young children have some natural affinity for living creatures regarding them as little friends and kindred spirits. The results of this study suggest quite the reverse. Very young children were the most exploitative, harsh and unfeeling of all children in their attitudes toward animals. They expressed far greater willingness to subvert the needs and nature of animals to enhance the well-being and desires of people and, perhaps not surprisingly, revealed the least knowledge or understanding of animals. These results suggest our cultural idealization of the relationship of very young children to animals is not only incorrect, but may foster a distorted understanding of the needs of young people. It has been postulated that our society tends to create a "make-believe" world for very young children, often ill-preparing them for encountering the inevitable pressures of reality. Perhaps an analogous situation with animals is our tendency to distort the actual capabilities of young people in relation to perceiving and valuing animals. These results suggest environmental education efforts involving children between 6 and 10 years old primarily focus on the affective realm, mainly attempting to instill in young children a sense of emotional identification and feeling for animals.

The transition from fifth to eighth grades witnessed a major expansion in children's intellectual and cognitive understandings of animals. This period was marked by a much broader and firmer grasp of the biological characteristics of animals and some of the physical parameters associated with natural habitats. The primary implication of this finding is the apparent value of emphasizing factual learning at this stage. This suggestion is consistent with the findings and conclusions of a number of other researchers including Horvat, Dyar, La Hart and Giles.

The third stage in the evolution of children's perceptions of animals occurred between 8th and 11th grades. During this time, children's ethical concern for the welfare and kind treatment of animals increased dramatically. Additionally, the children's ability to deal with abstract concepts such as ecosystems and biological diversity first manifested itself, as well as concern for a variety of wildlife protection and management issues. This stage in the evolution of children's attitudes towards animals, thus, appears to offer the best opportunity for emphasizing ethical relationships to animals and an appreciation of the concepts of ecology and wildlife management.

An examination of children's activities involving animals will require far more extensive study than occurred in this research. Two potentially important results, however, did emerge. First, very limited knowledge of animals among children who reported learning about animals in school and visiting zoos was particularly discouraging. Despite the widespread nature of these activities, they appear to have little lasting impact. Most zoological parks continue to fail in attempts to go beyond superficial entertainment to instilling a greater appreciation and knowledge of animals. Learning about animals in school appears to be so divorced from direct encounters with animals in their natural habitats that little basic understanding and lasting knowledge results. Our limited assessment of diverse school systems indicates minimal examination of the needs and characteristics of wildlife, particularly in relation to basic ecological processes. The typical biological school program tends to emphasize, instead, a reductionist focus on cellular and organic animal functioning, particularly in relation to human physiology and biology.

A more encouraging activity result concerned children who hunt, birdwatch and belong to animal-related clubs. In general, these children tended to be more appreciative, knowledgeable and concerned about animals, especially wildlife. These results suggest the virtue of providing direct, participatory contact between children and animals. Environmental educational programs should, therefore, emphasize experiential learning, as much as what might be gleaned from indirect sources of knowledge such as books and films.

A disappointing lack of knowledge and concern for animals was found among nonwhite and urban children. The former result was also strongly evident in the national adult study. It appears that far more will be required to demonstrate the relevance of wildlife and the well-being of natural environments to black children, especially those residing in large cities. Activity results suggest an emphasis on recreational involvement within the urban environment might be an effective educational strategy. If wildlife and the natural environment are to be regarded as serious and important issues by the majority of Americans, it will be necessary to capture the attention and imagination of urban residents, including the socioeconomically disadvantaged and nonwhite.

More generally, wildlife management agencies will have to devote far more attention and resources to the needs of children and environmental education. The results of this study suggest great opportunities for exercising meaningful influence. Unfortunately, a cursory examination of most Federal and state agencies indicates a pathetically small amount of attention being directed toward the broad wildlife education needs of children. More ambitious and imaginative efforts are required as the eventual condition of wildlife will, of course, depend on the future commitment and concern of today's children.

APPENDIX I

RESPONSES OF TOTAL SAMPLE TO ACTIVITY QUESTIONS

	PERCENT OF TOTAL POP. (N) = 267	PERCENT OF THOSE ANSWERING THE QUESTION
1. Have you ever had a wild animal as a pet?		
Yes	28.5 (75)	
No	71.5 (188)	
2. What kind of wild animal?		PERCENT OF WILDLIFE PET OWNERS(N)
Reptile/amphibian	7.5 (20)	26.3 (20)
Rabbit	6.7 (18)	23.7 (18)
Raccoon	2.6 (7)	9.2 (7)
Other	11.6 (31)	40.8 (31)
3. Have you ever had a pet bird?		
Yes	33.2 (88)	
No	66.8 (177)	
4. What kind of pet bird?		PERCENT OF PET BIRD OWNERS(N)
Canary/parakeet	16.9 (45)	60.8 (45)
Parrot/myna/cockatoo	4.5 (12)	16.2 (12)
Songbird	4.1 (11)	14.9 (11)
Other	2.2 (6)	8.1 (6)
5. Do you have any pets at home?		
Yes	76.0 (203)	
No	24.0 (64)	
6. Did you have any pets last year?		
Yes	87.1 (230)	
No	12.9 (34)	
7. What kind of pet?		PERCENT OF PET OWNERS(N)
Combinations of dogs and other pets	39.0 (103)	44.8 (103)
Dog only	24.7 (66)	28.7 (66)
Cat only	11.6 (31)	13.5 (31)
Fish	5.2 (14)	6.1 (14)
Other	5.9 (16)	7.0 (16)
8. Have you ever had a horse?		
Yes	11.7 (31)	
No	88.3 (233)	

APPENDIX I CONTINUED

	PERCENT OF TOTAL POP. (N) = 267			
9. When did you have a horse?			PERCENT OF HORSE OWNERS	(N)
Within last two years	7.2	(19)	61.3	(19)
More than two years ago	4.5	(12)	38.7	(12)
10. Hava you gone horseback riding in the past two years?				
Yes	47.0	(125)		
No	53.0	(141)		
11. How many times have you gone riding in the past two years?			PERCENT OF HORSEBACK RIDERS	(N)
1 - 2 times	18.7	(50)	39.1	(50)
3 - 10 times	17.9	(48)	37.5	(48)
11 or more times	11.2	(30)	23.4	(30)
12. Has your family ever raised livestock?	20.8	(55)		
13. Did your grandparents ever own a farm?	45.8	(109)		
14. Have you ever gone hunting?	17.6	(47)		
15. How many times have you gone hunting?			PERCENT OF HUNTERS	(N)
1 - 2 times	7.5	(20)	43.5	(20)
3 - 10 times	4.9	(13)	28.3	(13)
11 or more times	4.9	(13)	28.3	(13)
16. Have you gone hunting in the past two years?				
Yes	11.6	(31)	67.4	(31)
No	5.6	(15)	32.6	(15)
17. Does anybody in your family hunt?				
Yes	41.7	(110)		
No	58.3	(154)		
18. Do you go hunting with a family member?				
Yes	38.0	(41)		
No	62.0	(67)		
19. Are you opposed to sport Hunting? (11th grade only)				
Yes	81.2	(56)		
No	18.8	(13)		
20. Why are you opposed to sport hunting? (percent of 11th grade opposed)				

APPENDIX I CONTINUED

	PERCENT OF TOTAL POP. (N) = 267
Morally wrong	72.7 (40)
Pain inflicted	14.5 (8)
Love Animals	7.3 (4)
Other	5.5 (3)
21. Have you ever trapped wild animals?	
Yes	12.8 (34)
No	87.2 (232)
22. How many friends do you have who trap?	
0	74.2 (181)
1 - 2	16.0 (39)
3 or more	9.8 (24)
23. Does anybody in your family trap?	
Yes	16.6 (44)
No	83.4 (221)
24. Have you ever gone fishing?	
Yes	86.9 (232)
No	13.1 (35)
25. How many days have you gone fishing in the past two years?	
1 - 2 days	24.1 (49)
3 - 10 days	36.5 (74)
11 or more days	39.4 (80)
26. Does your family feed the birds?	
Yes	82.3 (219)
No	17.7 (47)
27. Do you belong to any clubs that do things with animals?	
Yes	8.2 (22)
No	91.8 (245)
28. Have you read any books about pets in the past year?	
Yes	50.0 (133)
No	50.0 (133)
29. How many books about pets have you read in the past year? (percent of pet book readers)	
1 - 3	66.2 (88)
4 - 10	21.8 (29)
11 or more	12.0 (16)

APPENDIX I CONTINUED

	PERCENT OF TOTAL POP. (N) = 267
30. Have you read any books about wild animals	
Yes	61.7 (164)
No	38.3 (102)
31. How many books about wild animals have you read in the past year? (percent of wildlife book readers)	
1 - 3	59.1 (97)
4 - 10	25.0 (41)
11 or more	15.9 (26)

32. How often do you watch the following TV shows? (11th grade only)

	OFTEN		SOMETIMES		RARELY/NEVER	
Wild Kingdom	27.9	(19)	45.6	(31)	26.5	(18)
National Geographic Specials on animals	23.9	(16)	35.8	(24)	40.3	(27)
Jacques Cousteau	21.2	(14)	56.0	(37)	22.8	(15)
In Search Of	12.3	(8)	26.2	(17)	61.5	(40)
Animals Animals Animals	9.1	(6)	34.9	(23)	56.0	(37)
NOVA Specials on Animals	7.4	(5)	13.3	(9)	79.4	(54)
American Sportsman	5.9	(4)	30.9	(21)	63.2	(43)
Last of the Wild	3.0	(2)	26.9	(18)	70.2	(47)
Wild Wild World of Animals	2.9	(2)	26.5	(18)	70.5	(48)
Wide World of Adventure	2.9	(2)	23.5	(16)	83.5	(50)

33. Have you ever gone to see a doctor because you were bitten by a dog?	
Yes	12.1 (32)
No	52.3 (137)
34. Have you ever gone to see a doctor because you were hurt by a wild animal?	
Yes	8.7 (23)
No	91.3 (242)
35. What wild animal hurt you? (percent of those hurt by wild animal)	
Bee, wasp	91.3 (21)
Other Insect	4.3 (1)
Other	4.3 (1)
36. Have wild animals ever hurt your family's garden?	
Yes	34.4 (90)
No	65.6 (172)

APPENDIX I CONTINUED

	PERCENT OF TOTAL POP. (N) = 267
37. Do you ever collect insects or butterflies or animal signs (e.g., feathers, nests, bones)?	
Yes	50.4 (134)
No	49.6 (132)
38. Have you gone to an aquarium in the past two years?	
Yes	67.0 (179)
No	33.0 (88)
39. How many times have you gone to an aquarium in the past two years? (percent of those who went to aquarium)	
1 - 2	79.3 (142)
3 - 10	20.1 (36)
11 or more	.6 (1)
40. Have you gone to a museum in the past two years?	
Yes	52.8 (141)
No	47.2 (126)
41. How many times have you gone to a museum in the past two years? (percent of those who went to a museum)	
1 - 2	79.4 (112)
3 - 10	17.0 (24)
11 or more	3.5 (5)
42. Have you gone camping overnight in the past two years?	
Yes	53.2 (142)
No	46.8 (125)
43. How many times have you gone camping overnight in the past two years? (percent of those who went camping)	
1 - 2	43.7 (62
3 - 10	37.3 (53)
11 or more	19.0 (27)

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